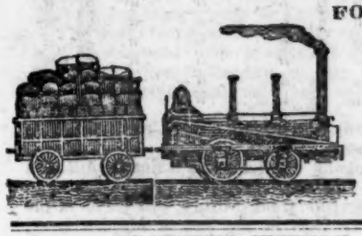
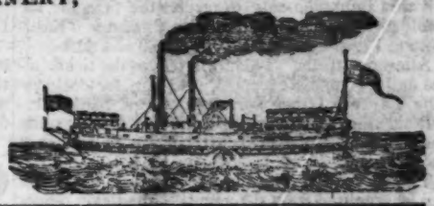
AMERICAN RAILROAD JOURNAL,

AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY, AND MINES.



ESTABLISHED 1831.



PUBLISHED WEEKLY, AT No. 23 CHAMBERS STREET, NEW YORK, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II., No. 24.] SATURDAY, JUNE 13, 1846. [WHOLE No. 520, VOL. XIX.

BOSTON AND PROVIDENCE RAILROAD. Passenger Notice. Summer Arrangement. On and after Monday, April 6, 1846, the Passenger Trains will run as follows:

For New York—Night Line, via Stonington. Leaves Boston every day, but Sunday, at 5 p.m.

Accommodation Trains, leave Boston at 7½ a.m. and 4 p.m., and Providence at 8 a.m. and 4½ p.m.

Dedham trains, leave Boston at 8 a.m. 12½ m., 3½ p.m., and 6½ p.m. Leave Dedham at 7 a.m. and 9½ a.m. and 2½ and 5½ p.m.

Stoughton trains, leave Boston at 11½ a.m. and 5½ p.m. Leave Stoughton at 7·20 a.m. and 3½ p.m.

All baggage at the risk of the owners thereof.

31 1y W. RAYMOND LEE, *Sup't.*

BRANCH RAILROAD and STAGES CONnecting with the Boston and Providence Railroad.

Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

NORWICH AND WORCESTER RAILROAD. Summer Arrangement, commencing Monday, April 6, 1846.

Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½ p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

☞ The morning Accommodation Trains from Norwich, and from Worcester, connect with the trains of the Boston, and Worcester and Western railroads each way.

The Evening Accommodation Train from Worcester connects with the 1½ p.m. train from Boston.

New York Train via Long Island Railroad:

Leave Allyn's Point for Boston, about 1 p.m., daily, except Sunday.

Leave Worcester for New York, about 10 a.m., stopping at Webster, Danielsonville, and Norwich.

New York Train via Steamboat—Leave Norwich for Boston, every morning, except Monday, on the arrival of the stamboat from New York, stopping at Norwich and Danielsonville.

Leave Worcester for New York, upon the arrival of the train from Boston, at about 4½ p.m., daily, except Sunday, stopping at Webster, Danielsonville and Norwich.

Freight Trains daily each way, except Sunday.—Special contracts will be made for cargoes, or large quanties of freight, on application to the superintendent.

☞ *Fares are Less when paid for Tickets than when paid in the Cars.* ☜

32 1y J. W. STOWELL, Sup't.

BOSTON AND MAINE RAILROAD. Upper Route, Boston to Portland via, Reading, Andover, Haverhill, Exeter, Dover, Great Falls, South & North Berwick, Wells, Kennebunk and Saco.

Summer Arrangement, 1846.

On and after April 13, 1846, Passenger Trains will leave daily, (Sundays excepted,) as follows:

Boston for Portland at 7½ a.m. and 2½ p.m.

Boston for Great Falls at 7½ a.m., 2½ and 4½ p.m.

Boston for Haverhill at 7½ and 11½ a.m., 2½, 4½ and 6 p.m.

Boston for Reading at 7½, 9, and 11½ a.m., 2½, 4½, 6 and 8 p.m.

Portland for Boston at 7½ a.m., and 3 p.m.

Great Falls for Boston at 6½ and 9½ a.m., and 4½ p.m.

Haverhill for Boston at 6½, 8½, and 11 a.m., and 4 and 6½ p.m.

Reading for Boston at 6½, 7½ and 9½ a.m., 12 m., 1½, 5 and 7½ p.m.

The Depot in Boston is on Haymarket Square.

Passengers are not allowed to carry Baggage above $50 in value, and that *personal* Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every $500 additional value. CHAS. MINOT, *Sup't.*

GEORGIA RAILROAD. FROM AUGUSTA to ATLANTA—171 MILES. AND WESTERN AND ATLANTIC RAILROAD FROM ATLANTA TO OOTHCALOGA, 80 MILES.

This Road in connection with the South Carolina Railroad and Western and Atlantic Railroad now forms a continuous line, 388 miles in length, from Charleston to Oothcaloga on the Oostenaula River, in Cass Co., Georgia.

Rates of Freight, and Passage from Augusta to Oothcaloga.

On Boxes of Hats, Bonnets, and Furniture per foot.....16 cts.
" Dry goods, shoes, saddlery, drugs, etc., per 100 lbs.....95 "
" Sugar, coffee, iron, hardware, etc.....65 "
" Flour, bacon, mill machinery, grindstones, etc.....33½ "
" Molasses, per hogshead $9·50; salt per bus.20 "
" Ploughs and cornshellers, each.....75 "

Passengers $10·50; children under 12 years of age half price.

Passengers to Atlanta, head of Ga. Railroad, $7.

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Co. will be forwarded free of commissions. Freight may be paid at Augusta, Atlanta, or Oothcaloga.

J. EDGAR THOMSON,
Ch. Eng. and Gen. Agent.

Augusta, Oct. 21 1845. ·44 1y

SUMMER ARRANGEMENT.—NEW YORK AND ERIE RAILROAD LINE, from April 1st until further notice, will run daily (Sundays excepted) between the city of New York and Middletown, Goshen, and intermediate places, as follows:

FOR PASSENGERS—

Leave New York at 7 A.M. and 4 P.M.
" Middletown at 6½ A.M. and 5½ P.M.

FARE REDUCED to $1 25 to Middletown—way in proportion. Breakfast, supper and berths can be had on the steamboat.

FOR FREIGHT—

Leave New York at 5 P.M.
" Middletown at 12 M.

The names of the consignee and of the station where to be left, must be distinctly marked upon each article shipped. Freight not received after 5 P. M. in New York.

Apply to J. F. Clarkson, agent, at office corner of Duane and West sts.

H. C. SEYMOUR, Sup't.

March 25th, 1846.

Stages run daily from Middletown, on the arrival of the afternoon train, to Milford, Carbondale, Honesdale, Montrose, Towanda, Owego, and West; also to Monticello, Windsor, Binghamton, Ithaca, etc., etc. Agent on board. 13 tf

BALTIMORE AND OHIO RAILROAD. MAIN STEM. The Train carrying the Great Western Mail leaves Baltimore every morning at 7½ and Cumberland at 8 o'clock, passing Ellicott's Mills, Frederick, Harpers Ferry, Martinsburgh and Hancock, connecting daily each way with—the Washington Trains at the Relay House seven miles from Baltimore, with the Winchester Trains at Harpers Ferry—with the various railroad and steamboat lines between Baltimore and Philadelphia and with the lines of Post Coaches between Cumberland and Wheeling and the fine Steamboats on the Monongahela Slack Water between Brownsville and Pittsburgh. Time of arrival at both Cumberland and Baltimore 5½ P. M. Fare between those points $7, and 4 cents per mile for less distances. Fare through to Wheeling $11 and time about 36 hours, to Pittsburgh $10, and time about 32 hours. Through tickets from Philadelphia to Wheeling $13, to Pittsburgh $12. Extra train daily except Sundays from Baltimore to Frederick at 4 P. M., and from Frederick to Baltimore at 8 A. M.

WASHINGTON BRANCH.

Daily trains at 9 A. M. and 5 P. M. and 12 at night from Baltimore and at 6 A. M. and 5½ P. M from Washington, connecting daily with the lines North, South and West, at Baltimore, Washington and the Relay house. Fare $1 60 through between Baltimore and Washington, in either direction, 4 cents per mile for intermediate distances. s13y1

BALTIMORE AND SUSQUEHANNA Railroad. The Passenger train runs daily except Sunday, as follows:

Leaves Baltimore at 9 a.m., and arrives at 6¼ p.m. Arrives at York at 12¼ p.m., and leaves for Columbia at 1¼ p.m. Leaves Columbia at 2 p.m., and leaves York for Baltimore at 3 p.m. Fare to York $2. Wrightsville $2 50, and Columbia $2 62½. The train connects at York with stages for Harrisburg, Gettysburg, Chambersburg, Pittsburg and York Springs.

Fare to Pittsburg. The company is authorized by the proprietors of Passenger lines on the Pennsylvania improvements, to receive the fare for the whole distance from Baltimore to Pittsburg. Baltimore to Pittsburg.—Fare through, $9 and $10.

Afternoon train. This train leaves the ticket office daily, Sundays excepted, at 3½ p.m. for Cockeysville, Parkton, Green Springs, Owings' Miils, etc.

Returning, leaves Parkton at 6 and Cockeysville and Owings' Mills at 7, arriving in Baltimore at 9 o'clock a.m.

Tickets for the round trip to and from any point can be procured from the agents at the ticket offices or from the conductors in the cars. The fare when tickets are thus procured, will be 25 per cent. less, and the tickets will be good for the same and following day any passenger train.

D. C. H. BORDLEY, *Sup't.*
31 1y Ticket Office, 63 North st.

CENTRAL RAILROAD—FROM SAVANnah to Macon. Distance 190 miles.

This Road is open for the transportation of Passengers and Freight. Rates of Passage, $8 00. Freight—

On weight goods generally...	50 cts. per hundred.
On measurement goods	13 cts. per cubic ft.
On brls. wet (except molasses and oil).....	$1 50 per barrel.
On brls. dry (except lime)...	80 cts. per barrel.
On iron in pigs or bars, castings for mills, and unboxed machinery.....	40 cts. per hundred.
On hhds. and pipes of liquor, not over 120 gallons.....	$5 00 per hhd.
On molasses and oil.....	$6 00 per hhd.

Goods addressed to F. WINTER, Agent, forwarded free of commission. THOMAS PURSE,
40 Gen'l. Sup't. Transportation.

NEW YORK & HARLEM RAILROAD CO.—Summer Arrangement.

On and after Friday, May 1st, 1846, the cars will run as follows:

Leave City Hall for Yorkville, Harlem and Morrianna, at 7, 8, 9, 10 and 11 a. m., and at 1, 2, 3 30, 4 30, 5, 6, and 6 30 p. m.

Leave City Hall for Fordham and Williams' Bridge, at 7, 10 and 11 a. m., and at 2, 3 30, 5, and 6 30 p. m.

Leave City Hall for Hunt's Bridge, Bronx, Tuckahoe, Hart's Corners and White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

Leave Harlem and Yorkville, at 7 10, 8 10, 9, 10, 11 10 a. m., and at 12 40, 2, 3 10, 5 10, 5 30, 6 10, and 7 p. m.

Leave Williams' Bridge and Fordham, at 6 45, 7 45, and 10 45 a. m., and at 12 15, 2 45, 4 45, and 5 45 p. m.

Leave White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

The freight train will leave the City Hall at 1 o'clock, p. m., and leave White Plains at 1 o'clock in the morning.

On Sundays, the White Plains train will leave the City Hall at 7 a. m. and 5 30 p. m.; will leave White Plains at 7 a. m. and 6 p. m.

On Sundays, the Harlem and Williams' Bridge trains will be regulated according to the state of the weather. 18

RAILROAD IRON.—THE "MONTOUR Iron Company," Danville, Pa., is prepared to execute orders for the heavy Rail Bars of any pattern now in use, in this country or in Europe, and equal in every respect in point of quality. Apply to MURDOCK, LEAVITT & CO., *Agents.*
Corner of Cedar and Greenwich Sts. 43 1y

LITTLE MIAMI RAILROAD.—1846.— Summer Arrangement.

Two passenger trains daily.

On and after Tuesday, May 5th, until further notice, two passenger trains will be run—leaving Cincinnati daily (Sundays excepted) at 9 a. m. and 1½ p. m. Returning, will leave Xenia at 5 o'clock 50 min. a. m., and 2 o'clock 40 min. p.m.

On Sundays, but one train will be run—leaving Cincinnati at 9, and Xenia at 5 50 min. a. m.

Both trains connect with Neil, Moore & Co.'s daily line of stages to Columbus, Zanesville, Wheeling, Cleveland, Sandusky City and Springfield.

Tickets may be procured at the depot on East Front street.

The company will not be responsible for baggage beyond fifty dollars in value, unless the same is returned to the conductor or agent, and freight paid at the rate of a passage for every $500 in value above that amount. W. H. CLEMENT,
19 Superintendent.

CALIGRAPHIC BLACK LEAD PENcil, Manufactured by E. Wolff and Son, 23 Church Street, Spitalfields, London.

The Caligraphic Pencils have been invented by E. Wolff and Son, after the expenditure of much time and labor. They are the result of many experments; and every effort that ingenuity and experience could suggest, has been made to insure the highest degree of excellence, and the profession may rely upon their being all that can be desired.

They are perfectly free from grit; and for richness of tone, depth of color, delicacy of tint, and evenness of texture, they are not to be equalled by the best Cumberland Lead that can be obtained at the present time, and are infinitely superior to every other description of Pencil now in use.

The Caligraphic Pencils will also recommend themselves to all who use the Black Lead Pencils as an instrument of professional importance or recreation, by their being little more than half the price of other pencils.

An allowance will be made on every groce purchased by Artists or Teachers.

May be had of all Artists, Colourmen, Stationers, Booksellers, etc.

A single pencil will be forwarded as a sample, upon the receipt of postage stamps to the amount.

Caution.—To prevent imposition, a highly finished and embossed protection wrapper, difficult of imitation, is put around each dozen of Pencils. Each Pencil will be stamped on both sides, "Caligraphic Black Lead, E. Wolff and Son, London."

The subscriber has on hand a full supply of Wolff and Sons celebrated Creta Loevis, or Colored Drawing Chalks, also their pure Cumberland Lead and extra prepared Lead Pencils, and Mathematical Lead Pencils.

P. A. MESIER,
Stationer and Sole Agent,
No. 49 Wall Street.

N. B.—A complete assortment of Steven's *Genuine* Inks, Fluids, Imitating Wood stains, and Graining Colours at the Manufacturers prices.

KEARNEY FIRE BRICK. F. W. BRINLEY, Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire, Peter Cooper, Murdock, Leavirt & Co. } New York.
J. Triplett & Son, Richmond, Va.
J. R. Anderson, Tredegar Iron Works, Richmond, Va.
J. Patton, Jr. Colwell & Co. } Philadelphia, Pa.
J. M. L. & W. H. Scovill, Waterbury, Con.
N. E. Screw Co. Eagle Screw Co. } Provicence, R. I.
William Parker, Supt. Bost. and Worc. R. R.
New Jersey Malleable Iron Co., Newark, N. J.
Gardiner, Harrison & Co. Newark, N. J.

25,000 to 30,000 made weekly. 35 1y

FLAT BAR, ENGLISH ROLLED, RAILroad Iron, 2½ ⋈ ½—a large part suitable to relay. For sale by C. J. F. BINNEY,
Commission Merchant, 1 City Wharf,
11 1m Boston, Mass

TROY AND GREENBUSH RAILROAD. Spring Arrangement. Trains will be run on this Road as follows, until further notice, Sundays excepted.

Leave Troy at		Leave Albany at	
6½	A.M.	7	A.M.
7½	"	8	"
8½	"	9	"
9½	"	10	"
10½	"	11	"
11½	"	12	M.
1	P.M.	1½	P.M.
2	"	2½	"
3	"	3½	"
4	"	4½	"
5	"	5½	"
5½	"	6	"
6½	"	7	"

☞ The 6½ a.m. and 2 o'clock p.m. runs from Troy, to Boston runs.

The 12 m. and 6 o'clock p.m. trains from Boston runs.

☞ Passengers from Albany will leave in the Boston Ferry Boat at the foot of Maiden Lane, which starts promptly at the time above advertised.

Passengers will be taken and left at the principal Hotels in River Street, in Troy, and at the Nail Works and Bath Ferry.

L. R. SARGENT,
Superintendent.
Troy, April 1st, 1846. 14 1y

MACHINE WORKS OF ROGERS, Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works being extensive and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

Railroad Work.

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery

of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally; hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
a45 Paterson, N. J., or 60 Wall street, N. York.

TO RAILROAD COMPANIES AND MANufacturers of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside. THOMAS & EDMUND GEORGE,
ja45 N. E. cor. 12th and Market sts., Philad., Pa.

THE SUBSCRIBERS, AGENTS FOR the sale of

Codorus, Glendon, Spring Mill and Valley, } Pig Iron.

Have now a supply, and respectfully solicit the patronage of persons engaged in the making of Machinery, for which purpose the above makes of Pig Iron are particularly adapted.

They are also sole Agents for Watson's celebrated Fire Bricks and prepared Kaolin or Fire Clay, orders for which are promptly supplied.

SAM'L. KIMBER, & CO.,
59 North Wharves,
Jan. 14, 1846. [1y4] *Philadelphia, Pa.*

RAILROAD IRON AND LOCOMOTIVE Tyres imported to order and constantly on hand by A. & G. RALSTON
Mar. 20tf 4 South Front St., Philadelphia.

THE NEWCASTLE MANUFACTURING Company continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention. ANDREW C. GRAY,
a45 President of the Newcastle Manuf. Co.

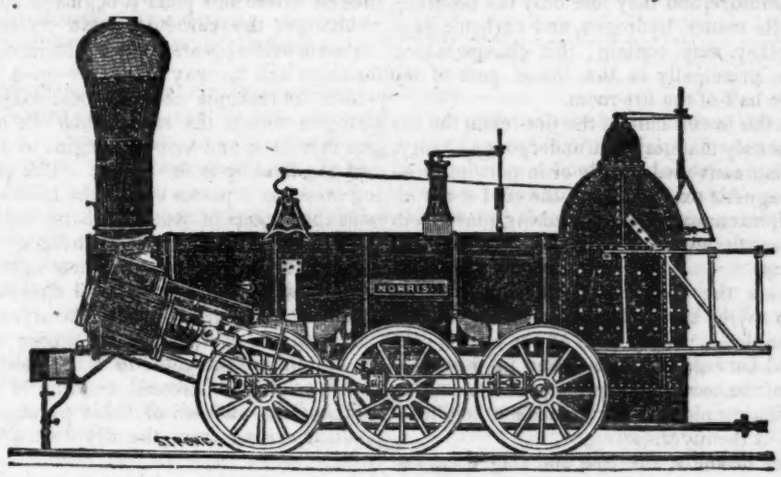
CUSHMAN'S COMPOUND IRON RAILS. etc. The Subscriber having made important improvements in the construction of rails, mode of guarding against accidents from insecure joints, etc. —respectfully offers to dispose of Company, State Rights, etc., under the privileges of *letters patent* to Railroad Companies, Iron Founders, and others interested in the works to which the same relate. Companies reconstructing their tracks now have an opportunity of *improving* their roads on terms very advantageous to the varied interests connected with their construction and operation; roads having to use flat bar rails are particularly interested, as such are permanently available by the plan.

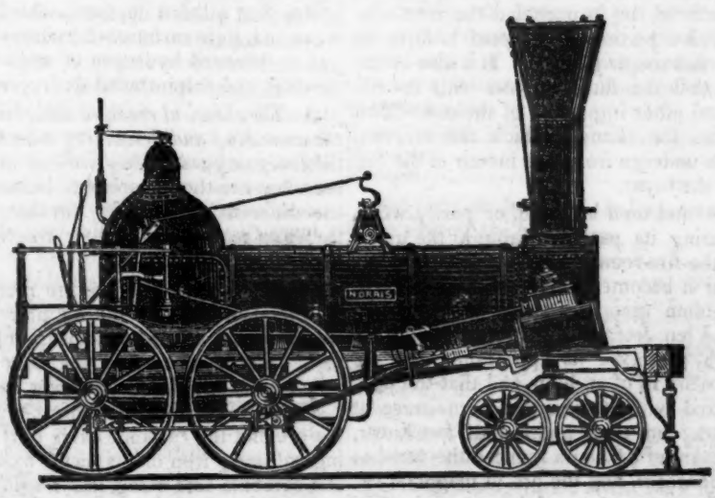
W. Mc. C. CUSHMAN, *Civil Engineer*,
Albany, N. Y.

Mr. C. also announces that Railroads, and other works pertaining to the profession, may be constructed under his advice or personal supervision. Applicaitons must be post paid.

NORRIS LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.





MANUFACTURE their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following descriptions, viz:

Class	1,	15	inches	Diameter	of	Cylinder,	× 20	inches	Stroke.
"	2,	14	"	"	"		× 24	"	"
"	3,	14½	"	"	"		× 20	"	"
"	4,	12½	"	"	"		× 20	"	"
"	5,	11½	"	"	"		× 20	"	"
"	6,	10½	"	"	"		× 18	"	"

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion.

Castings of all kinds made to order: and they call attention to their Chilled Wheels for the Trucks of Locomotives, Tenders and Cars

NORRIS, BROTHERS.

TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.

PASCAL IRON WORKS.

WELDED WROUGHT IRON TUBES

From 4 inches to ¼ in calibre and 2 to 13 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T's, L's, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER Flues.

Manufactured and for sale by
MORRIS, TASKER & MORRIS.
Warehouse S. E. Corner of Third & Walnut Streets,
PHILADELPHIA.

GREAT SOUTHERN MAIL LINE! VIA Washington city, Richmond, Petersburg, Weldon and Charleston, S. C., direct to New Orleans. The only Line which carries the Great Southern Mail, and Twenty-four Hours in advance of Bay Line, leaving Baltimore same day.

Passengers leaving New York at 4½ P.M., Philadelphia at 10 P.M., and Baltimore at 6½ A.M., proceed without delay at any point, by this line, reaching Richmond in *eleven*, Petersburg in *thirteen and a half hours*, and Charleston, S. C., in *two days* from Baltimore.

Fare from Baltimore to Charleston.....$21 00
" " " Richmond..... 6 60

For Tickets, or further information, apply at the *Southern Ticket Office*, adjoining the *Washington Railroad Office*, Pratt street, Baltimore, to
STOCTON & FALLS, Agents.

GEORGE VAIL & CO., SPEEDWELL IRON Works, Morristown, Morris Co., N. J.—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1¼ in. to 2½ in thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descripions.
ja451y

NICOLL'S PATENT SAFETY SWITCH for Railroad Turnouts. This invention, for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design.

It acts independently of the main track rails, being laid down, or removed, without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two Castings and two Rails; the latter, even if much worn or used, not objectionable.

Working Models of the Safety Switch may be seen at Messrs. Davenport and Bridges, Cambridgeport, Mass., and at the office of the Railroad-Journal, New-York.

Plans, Specifications, and all information obtained on application to the Subscriber, Inventor, and Patentee. G. A. NICOLLS,
ja45 *Reading, Pa.*

RAILROAD IRON WANTED. WANted, 50 tons of Light Flat Bar Railroad Iron. The advertisers would prefer second-hand iron, if not too much worn. Address Box 384 Philadelphia P. O.—Post paid. 8 4t

Blast Furnace.

The following "Observations" contain the substance of all the recent investigations into the Theory of the Blast Furnace. The clear and simple exposition of the subject is due entirely to Dr. Smith, whose reputation is a sufficient guarantee for the accuracy with which the views of various experimenters are condensed into a space better adapted to the taste and leisure of practical men, than that occupied by the original memoirs.

The importance of the paper required an earlier notice, but it is only recently that a copy of the article has reached us.

Observations on the more recent researches concerning the operations of the Blast Furnace in the Manufacture of Iron.—By Dr. J. L. Smith.

From Silliman's Journal for March, 1846.

The great difference existing between metallurgical operations of the present day, and those of a former period, is owing chiefly to the ameliorations produced by the application of the science of chemistry to the *modus operandi* of the various changes taking place during the operations, from their commencement to their termination.

Copper and some other metals are now made to assume forms in the chemist's laboratory, that formerly required great artistical skill for their production—the chemist simply making use of such agents and forces as are at his command, and over which he has, by close analytical study, acquired perfect control. Our object, at present, is only to advert to the chemical investigations more recently made on the manufacture of iron, treating of those changes that occur in the ore, coal, and flux, that are thrown in at the mouth of the furnace, and in the air thrown in from below. For most that will be said on this subject, we are principally indebted to the recent interesting researches of M. Ebelman.

The importance of a knowledge of the facts to be brought forward in this article, will be apparent to every one in any way acquainted with the manufacture of iron. It will be seen, that the time is not far distant when the economy in the article of fuel will amount in value to the present profit of many of the works. The consequences must be, that many of those works that are abandoned will be resumed, and others erected in localities formerly thought unfit.

It is well known that the blast furnace is the first into which the ore is introduced, for the purpose of converting it into malleable iron, and much therefore depends upon the state in which the pig metal passes from this furnace, whether subsequent operations will furnish an iron of the first quality or not.

In putting the blast furnace into operation, the first step is to heat it for some time with coal only. After the furnace has arrived at a proper temperature, ore, fuel and flux, are thrown in alternately in small quantities, so as to have the three ingredients properly mixed in their descent. In from 25 to 48 hours from the time when the ore is first thrown in, the entire capacity of the furnace, from the tuyer to the mouth, is occupied with the ore, fuel, and flux, in their various stages of transformation.

In order to explain clearly, and in as short space as possible, what these transformations are, and how they are brought about, we may consider:—1. The changes that take place in the descending mass, composed of ore, fuel and flux.—2. The changes that take place in the ascending mass, composed of air and its hygrometric moisture, thrown in at the tuyer. 3. The chemical action going on between the ascending and descending masses.—4. The composition of the gases in various parts of the furnace during its operation.—5. The causes that render necessary the great heat of the blast furnace.

1. *Changes that take place in the descending mass, composed of ore, coal and flux.*—By coal is here meant charcoal; when any other species of fuel is alluded to, it will be specified. In the upper half of the fire-room, the materials are subjected to a comparatively low temperature, and they lose only the moisture, volatile matter, hydrogen, and carbonic acid, that they may contain; this change taking place principally in the lower part of the upper half of the fire-room.

In the lower half of the fire-room, the ore is the only material that undergoes a change, it being converted wholly or in part into iron or magnetic oxide of iron—the coal is not altered, no consumption of it taking place from the mouth down to the commencement of the boshes.

From the commencement of the boshes down to the tuyer, the reduction of the ore is completed. Very little of the coal is consumed between the boshes and in the upper part of the hearth; the principal consumption of it taking place in the immediate neighborhood of the tuyer.

The fusion of the iron and slag occurs at a short distance above the tuyer, and it is in the hearth of the furnace that the iron combines with a portion of the coal to form the fusible carburet or pig-iron. It is also on the hearth that the flux combines with the siliceous and other impurities of the ore. This concludes the changes which the ore, coal and flux undergo from the mouth of the furnace to the tuyer.

If the fuel used be wood, or partly wood, it is during its passage through the upper half of the fire-room that its volatile parts are lost, and it becomes converted into charcoal. M. Ebelman ascertained that wood, at the depth of ten feet, in a fire-room twenty-six feet high, preserved its appearance after an exposure for 1¾ of an hour, and that the mineral mixed with it preserved its moisture at this depth; but three and a half feet lower, an exposure of 3¼ hours reduced the wood to perfect charcoal, and the ore to magnetic oxide. The temperature of the upper half of the fire-room, when wood is used, is lower than in the case of charcoal, from the great amount of heat made latent by the vapour arising from the wood. In the case of bituminous coal, Bunsen and Playfair find that it has to descend still lower before it is perfectly coked.

After the wood is completely charred, or the coal become coked, the subsequent changes are the same that happen in the charcoal furnaces.

2. *Changes that take place in the ascending mass, which is composed of air and hygrometric moisture.*—The weight of the air thrown in at the tuyer in twenty-four hours is twice that of the ore, coal and flux, thrown in at the mouth during the same time.

The air, as soon as it enters the tuyer and reaches the first portion of coal, undergoes a change—its oxygen is converted into carbonic acid, and its moisture decomposed, furnishing dydrogen and carbonic oxide—after ascending a short distance (12 or 18 inches), the carbonic acid is converted into carbonic oxide—between this point and the upper part of the boshes it undergoes but very little change, having added to it a further small amount of carbonic oxide. So the ascending column at the top of the boshes is composed of nitrogen, carbonic oxide and hydrogen—from this point it begins to undergo a change; the carbonic oxide diminishes, carbonic acid appears, and goes on increasing for about half the way up the fire-room; after which the carbonic acid, carbonic oxide, and nitrogen remain the same, when the hydrogen increases, and moisture begins to appear and augment up to the mouth. The ascending mass, as it passes out of the mouth, contains the vapour of water, carbonic acid, carbonic oxide, hydrogen, and nitrogen. The nitrogen undergoes no alteration in its passage through the furnace, and the same is true of the dydrogen formed at the tuyer.

If wood be used, the gases passing out of the mouth are the same as those just mentioned, with an increased quantity of moisture, and the addition of those pyroligneous products arising from the dry distillation of wood.

In case of the use of bituminous coal, the gases, first alluded to, have added to them ammonia, light carburetted hydrogen, elefiant gas, carburetted hydrogen of unknown composition, and sulphuretted dydrogen.

3. *The chemical reaction occurring between the ascending and descending masses.*—From the foregoing statements we can at a glance see what are the materials to be met with in the different parts of the furnace, and can therefore readily study their reactions upon each other.

In the upper half of the fire room little or no chemical action is taking place, the ore, flux and coal, as already stated, simply losing their volatile parts. In the bottom of the upper half and the entire lower half of the fire room a reaction is taking place between the ore and the carbonic oxide of the ascending column; iron or magnetic oxide of iron and carbonic acid being the result. It must be borne in mind that the coal has played no part in this reduction down to the commencement of the boshes. Between the boshes, and in the hearth, no reaction appears to take place between the ascending and descending masses, but the reduction of the ore is completed by the direct action of the coal upon the remaining portion of the undecomposed ore; carbonic oxide being formed;—and here is the first consumption of the coal in its passage downwards.

According to M. Ebelman, the ore lose

in the fire-room $\frac{2}{3}\frac{8}{3}$ of its oxygen by the reaction of the oxide of carbon, and the remaining $\frac{5}{3}\frac{}{3}$ disappears in the boshes and hearth, in the manner already stated, at the expense of from $\frac{6}{1}\frac{}{0}\frac{}{0}$ to $\frac{1}{1}\frac{2}{0}\frac{}{0}$ of the entire amount of charcoal used.

The ore being now completely reduced, unites with a portion of carbon in the hearth, melts at about 13 inches from the tuyer, and descends into the crucible; and here also the flux, combining with the impurities of the ore, forms the slag, which melts.

The coal and the air react upon each other most powerfully, just in the neighborhood of the tuyer, where the most intense heat is produced; the oxygen becomes converted into carbonic acid, which acting upon a portion of the ignited coal, is almost at the same moment reduced to carbonic oxide; the moisture of air acting on the ignited charcoal undergoes the decomposition already mentioned, hydrogen and carbonic oxide resulting therefrom.

When the ore is easy of reduction, the gas at the boshes is represented by 100 nitrogen and 52 5 carbonic oxide, *plus* the quantity of carbonic oxide and hydrogen afforded by the moisture.

It must be clearly understood, that these rules do not apply to every variety of ore. They are especially applicable to the hemetites and such ores as are either naturally porous or become so in their passage through the fire-room of the furnace, thus increasing the surface of contact exposed to the action of the reducing agent (carbonic oxide), so that when it has reached the boshes the reduction is nearly complete.

The specular, magnetic, and siliceous ores, are reduced with much more difficulty; most of the ore, in these cases, reaching the boshes but slightly altered, they being principally dependant upon the direct action of coal for their reduction. This circumstance largely increases the consumption of coal when any of these ores are employed; and the amount of caloric made latent, in consequence of the reduction requiring the direct action of the coal, is very great; whereas in the reduction of the ore by carbonic oxide no heat becomes latent, for the heat rendered latent by the oxygen of the ore becoming gaseous, is compensated by the sensible heat produced by the combination of the carbonic oxide with the oxygen. Where the reduction is produced by the carbon, with the formation of carbonic oxide, 1598 unities of heat are made sensible, while 6216 are rendered latent, giving a difference of absolute loss of 4618.

It should be the object of the metallurgist to reduce as much of the iron as possible by the oxide of carbon. Magnetic, siliceous, and other hard ores, should be reduced to smaller fragments than those softer and more easily managed. Were it possible to reduce them to powder without the danger of choking the furnace, it would be all the better, as the great object is o have a large extent of surface exposed to the carbonic oxide. The different capacity of different ores for reduction shows the necessity of having furnaces of different dimensions for them respectively.

The matter which covers the melted metal in the crucible, and that which adheres to the interior of the hearth, contains silicate of iron and charcoal in a pasty state, and there is consequently a constant reduction of the oxide of iron, which gives rise to carbonic oxide; this gas bubbles through the slag, which, if drawn off at this time, will, when cold, present a porous structure,—a sure indication that the furnace is not working well, and that the slag, itself contains much of the ore in the form of a silicate.

4. *Composition of the gas in various parts of the furnace during its operation.*—The analysis lately made by Ebelman are the most accurate and best detailed that we are in possession of. What follows has reference to a furnace worked with charcoal.

Gas taken from the mouth of the furnace and dried:

Carbonic acid	12·88
Carbonic oxide	23·51
Hydrogen	5·82
Nitrogen	57·79

The vapor of water in a hundred columns of this gas, varies from nine to fourteen volumes. Examinations made at different times show the proportion of hydrogen to be nearly uniform, and that the sum of the volumes of carbonic acid and carbonic oxide is constant, but that there is a variation in their respective proportions.

Gas taken from the interior of the fire-room at 5 to 10, and 13 to 17 feet from the mouth (fire-room 36 feet). From five to ten feet the proportion of moisture diminishes, the other ingredients remaining about the same. From 13 to 17 feet the proportion of carbonic oxide increases, while the carbonic acid and hydrogen diminish.

Gas from the bottom of the fire-room and top of the boshes:—This is remarkable for the constancy of its composition, and for the absence of carbonic acid and watery vapor. Composition:—

Carbonic oxide	35·01
Hydrogen	1·92
Nitrogen	63·07

Gas from the bottom of the boshes and commencement of the hearth:—

Carbonic acid	0·31
Carbonic oxide	41·59
Hydrogen	1·42
Nitrogen	56·68

Gas from the neighborhood of the tuyer:

Carbonic oxide	51·35
Hydrogen	1·25
Nitrogen	47·40

The two last statements would appear to contradict the rules previously laid down, as regulatiug the operation of the blast furnace; for, according to them, the proportion of carbonic oxide, at the top of the boshes, should be a little greater than in the hearth, whereas the reverse would appear to be the case by the analysis here given. Besides, from a glance at the composition of the three last gases alluded to, it would appear that the gaseous products, as they ascended the furnace, lost completely a portion of the carbonic oxide, without a replacement by carbonic acid or other compound; in other words, a portion of it would appear to be completely annihilated, which of course is an impossibility. This apparent anomaly is easily accounted for, when it is stated how the gas was collected.

In order to obtain the gas from different portions of the furnace, holes were bored into the side, and a tube inserted, by which it was drawn off. Allusion has already been made to the fact that a pasty mass adheres to the sides of the hearth, containing silicate of iron and charcoal, in which there is a constant reduction of the iron, with the formation of carbonic oxide. Now it is evident that the gas drawn off by a hole bored into the side of the hearth, will be largely mixed with this carbonic oxide forming in the immediate neighborhood of the opening, and that it cannot serve as an index to the character of gas passing through the centre of the hearth. M. Ebelman was aware of this fact, but he was not able to overcome the difficulties in the way of obtaining the gas under the proper circumstances.

Gas taken at the tuyer.—Here it is little else than atmosphere mixed with a few per cent. of carbonic acid.

From these results it will not be difficult to admit, that the oxygen of the air is converted immediately into carbonic acid, which is rapidly changed into carbonic oxide, under the influence of an excess of carbon and the high temperature developed near the tuyer.

5. *The causes that render necessary the great heat of the blast furnace.*—The weight of the ore, flux, and combustible, which enters the furnace, being only one-half that of the ascending column, and as the specific heat of these three materials is very much below that of the gas of the ascending mass, it is not the heating of them that explains the necessity of the very great heat of the blast furnace. But the principal cooling causes are,—

1. The drying of the ore, flux and coal, and the expulsion of carbonic acid from the flux, etc., rendering much of the heat latent; for what was solid is now transformed to the gaseous state.

2. The reduction of the ore, or in other words, the transformation of the solid oxygen of the ore into gaseous oxygen. If the ore has been deprived of its oxygen by the action of carbonic oxide, with the formation of carbonic acid, the heat rendered latent by the oxygen, is compensated for by the heat developed by the reaction between the oxygen and carbonic oxide; which is the character of the operation that principally takes place in the lower part of the fire-room. If the ore has been deprived of its oxygen by the direct action of the coal, the amount of heat rendered latent is enormous, as already stated; for carbonic oxide is the result of this reaction, and the amount of heat developed by it falls far short of that rendered latent by the oxygen that has entered into its formation, assuming the gaseous condition,—this is the character of the reduction taking place in the boshes and hearth.

3. The conversion of the carbonic acid near the tuyer into carbonic oxide has a powerful influence in cooling the upper part of the hearth; for of the 6260 units of heat formed

by the first action of the air upon the coal, 4662 are rendered latent by the conversion of this carbonic acid into carbonic oxide.

This terminates what it was proposed to treat of; it is little else than a sketch of the chemistry of the blast furnace, sufficient to show its importance.

In a future article, some remarks will be made upon the amount of combustible lost in the operation of this furnace, the recent methods employed to prevent this loss in the complete combustion of coal, the action of the hot blast, theory of the refining furnace, charring of wood, and other points of interest.

The Alterations to be Effected in the "Great Britain" Considered, and the Virtues of the Screw Propeller still further Developed. By Commander J. C. Hoseason, R. N.

"Says Hudibras to Don Fernando,
What can a screw do more than it can do?"

Sir:—When last I had the pleasure of addressing to you a letter upon the properties of the screw propeller, I had not the advantage which I now possess, of knowing the various opinions of nearly all the parties who were present during the experimental trips of the *Rattler* and *Alecto;* but I have since had the good fortune to be introduced to many others, who authenticate to the letter every objection raised by me in your magazine of January 24, 1846. I am therefore not at all astonished to learn that the proprietors of the *Great Britain* deem it necessary to make most important alterations in the masting of that steamer; the nature of which alterations clearly proves that they no longer consider the screw propeller in any other light than that of a *mere* auxiliary; and thus a steam vessel which it was affirmed would be the fastest out of the ports of England, will soon, despite her *thousand nominal horse power*, sink into so insignificant a position as hardly to be able to hold her place amongst the American sailing packets. I should not consider it my *duty* to comment further upon this vessel; but that the baneful influence of the erroneous opinions entertained by the projectors of that *sad* scheme, made converts of others, and induce them to advocate, without sufficient consideration, a too general adoption of the screw propeller into the navy.

Amongst the manifold mischiefs attendant upon the screw as a propeller, there is one, marked, clear, and decisive; but which, from the nature of the line of argument adopted by me, could not find place in my last letter. I here speak, sir, of the frightful and dangerous rolling which is the inevitable consequence of this mode of propulsion. Engineers too often hold in sovereign contempt the long tried experience of the *seaman;* they consider their theoretical notions of the action of a sea upon a steamer as more infallible than the laws of the Medes and Persians: and you may labor in vain to convince them that your practical experience, acquired in every variety of weather, is not to be held in contempt or despised with *impunity.*

I may safely affirm that *my* profession, *almost* to a man, came very early to the conclusion, that the results of the experiments with screw propellers were anything but satisfactory; and the most they deemed it right and proper to recommend was, that still further experiments ought to be carried out.

The ruin of a company possessed of a handsome capital, will I trust, act as a salutary lesson, and induce engineers the more readily to believe for the future, that their theoretical deductions will often be found diametrically opposed to *facts.*

I now hear that the engineers of the Great Western company hope to make a material decrease of the frightful rolling of the *Great Britain*, by placing whale pieces along each bilge, of 110 feet long, 2 feet wide, and 2 feet deep!! This will most effectually retard the velocity of the *Great Britain* through the water, but will not, I take it, materially decrease her propensity to roll, particularly when under steam, with the wind about two points on the bow.

The simple cause of her terrific rolling is that she is *not* a paddle wheel steamer; for were she so, the wheels would effectually serve to check so great a defect, for the weather wheel would require a powerful force to raise it out of the water, and the *lee* wheel a still greater force to immerse it; thus, then, most powerful counteracting effects would be in full operation to bring within some degree of limitation so dangerous and mischievous a tendency.

It is curious that engineers seem entirely ignorant of the very simple *fact*, that a dismasted ship rolls most dangerously, so much so, that after a general action, it has been hardly possible to stand upon the vessel's deck; now, a steamer in a heavy swell, and *not* under *canvass*, may be likened to a dismasted ship; and nothing but what has been deemed the unsightly paddle wheels, will be found to counteract so injurious a defect.

I am now in a position to place before you some interesting experiments which have been carried out on board the *Bee* steamer, at Spithead, which is, as you are aware, built so that the engines can work alternately, or even simultaneously, both the screw and the paddle wheel.

In consequence of my stating in my letter, published in your magazine, that the screw steamer's engines would be required to be kept *nearly* at a maximum, whatever the velocity of the steamer might be through *the water*, the officers of the royal naval college, at Portsmouth, have very properly been carrying out experiments to set so simple a matter at rest. The following is an extract from a letter, which the writer has received, giving the results of these experiments:

Portsmouth, April 4, 1846.

"The screw is now in the *Bee*, and the other day, at Spithead, head to wind and sea, she was going but one knot with 33 revolutions per minute, and with the same wind, had the paddles been on, she would have gone four knots. We tried her with the *expansion* gear on 23 revolutions against a fresh breeze; she went only one quarter of a knot, just holding her own; now with the paddle wheels, with that number of revolutions, and the same force of wind, (about 5,) she would have gone three knots. When we went before the wind with the *expansion* gear, she went four knots; mark the *slip* of the screw in the case of the steamer going head to wind when compared to running before it. The experiments I intended to make are vitiated, in consequence of the new screw having too much surface: the engines at full speed only making 34 revolutions per minute, when they should be 40, that being the power of the boiler, and the same that the wheels are proportioned to balance."

Now Mr. Editor, I wish to point out a simple truth or two deduced from the above experiments, that to obtain a velocity of only one knot per hour against a head sea, the revolutions were forced to be kept up within *one* of the maximum; and that when the *expansion* gear was put on, with the view to reduce the speed of the engines and economize fuel, *twenty-three cylinders full of steam per minute were consumed in standing still!!* Oh, most admirable virtues of the screw! Only fancy a steamer burning fuel to all eternity while standing still! This is to the letter all that I have written and predicted of the screw.

Had the patentee of the screw *not* increased its *surface*, the effects would have been even *worse* against a head sea. The following is from another letter from Portsmouth:

"The *Bee's* screw is unshipped to reduce the *surface* of the screw, so that we can work up to the full power of the boiler; of course we shall have a greater per centage of *slip*, more especially when head to wind and sea."

You will perceive, Mr. Editor, from the perusal of the above, that *two* sorts of screws, at least, are necessary to be fitted for each vessel, the one for smooth water, and the other to be used against a *head wind and sea.*

I have heard that some *frantic schemer* made a proposition to have several different screws fitted, to meet these variable circumstances, the same to be thrown into gear as need might be! Just imagine for a moment your being under the necessity of stopping your engines in a heavy gale of wind, upon a lee shore, to ship and unship screws varying in weight from two to four tons!

The *Rattler* on her last cruise unshipped her screw, to place her under sail alone, as she could not steam off a lee shore, and the following day was not able to ship her screw even in a dead calm! So much for the anticipations of landsmen.

The *Phœnix* screw steamer in a *moderate* gale, when head to wind, absolutely—so the officers state—*stands and looks at it*—the engines working at heaven knows what number of revolutions, and consuming no end of fuel, standing still! Behold what *science* has effected at last. A steamer of 260 horse power and 800 tons burden, burning away fuel without any limit, and not advancing one foot towards her destination!

I presume, sir, you have read in the daily papers of the *Massachusetts* auxiliary screw steamer, which vessel was so much eulogized in your magazine by her owners. She just took forty-two days to perform her *last* voyage to New York; thus demonstratively establishing the *fact* by that, as well as all pre-

vious voyages, that her auxiliary screw has only been an effectual retarding power.

I cannot conclude this important letter, written with the single object of eliciting the truth, without clearly and distinctly stating that I am personally unacquainted with every individual connected with the Great Western company, and also with nearly all the patentees of the screw propellers, whose interests may be affected by this as well as my former letter. No individual more admires the mass of talent, whose interests are involved, than the writer; nor should I have considered myself called upon to write a single line in your magazine, but to guard *my* profession against having foisted upon them the erroneous opinions of others. The vessels whose performances I have criticised, have hitherto afforded themes of inexhaustible panegyric—the papers have for more than a year past teemed with most lauditory accounts of their beautiful performances, the public, misled by what they have seen and heard have called aloud for the universal adoption of the screw into the navy—and public lecturers have pointed out the necessity of no further delay. The writer then thought it high time to step forward to rescue his profession from the mischief which its too general adoption would give rise to. His first letter told with fearful effect; this second will settle the question for ever.

"*Magna est veritas et pravalebit.*"

Your obt. servant,

J. C. Hoseason, Commander, R. N.

Army and Navy Club,
St. James's Square.

April 22, 1846.

Power to overcome inertia of Railway Trains.

Paper read at the Royal Society, on the *Investigation of the power consumed in overcoming the Inertia of Railway Trains, and of the Resistance of the Air to the Motion of Railway Trains at high velocities*, by P. W. Barlow, Esq.—The object of the author in this inquiry is to obtain a more correct knowledge than has hitherto been possessed of the resistance which the air opposes to the motion of locomotive engines at high velocities, and of the loss of force arising from increased back pressure, and the imperfect action of steam. For this purpose he institutes a comparison between the velocities actually acquired by railway trains with those which the theory of accelerated motion would have assigned; and his experiments are made not only on trains propelled by a locomotive engine, but also on those moving on the atmospheric railway, which latter afford valuable results, inasmuch as the tractive force is not subject to the losses at high velocities necessarily incident to locomotive engines. A table is given of the theoretical velocities resulting from calculations founded on the dynamical law of constant accelerating forces, in the case of trains of various weights, impelled by different tractive forces, moving from a state of rest, and is followed by another table of the observed velocities in Mr. Stephenson's experiments on the Dalkey line; the result of the comparison being that, in a distance of a mile and a quarter, the loss of velocity is about one-half of the observed velocity. A series of experiments on locomotive lines is next related; but the comparison is less satisfactory than in the former case, because the tractive force cannot be so accurately estimated; it is, however, sufficiently so to establish the fact, that the power lost by the locomotive engine below the speed of thirty miles per hour, is so small as to be scarcely appreciable; and that the time and power which are absorbed in putting a railway train in motion are almost entirely required to overcome the inertia of the train, and do not arise from any loss or imperfection of the engine. It appears from these experiments that above one-fifth of the whole power exerted is consumed in putting the train in motion at the observed velocity. In the atmospheric railway the author finds that the tractive force of a fifteen-inch pipe is so small (being less than half that of a locomotive engine) that the time of overcoming the inertia must limit the amount of traffic on a single line, especially with numerous stations. When a great velocity is obtained, the tractive force of the locomotive is much reduced, and, therefore, a much greater velocity can be attained on an atmospheric railway. The inquiries of the author into the amount of resistance exerted by the air on railway trains, lead him to the conclusion that on the atmospheric railway the loss of the tractive power of the piston from friction, etc., is very inconsiderable, and that the resistance of the air is less than had been hitherto estimated, not exceeding, on an average, ten pounds per ton on the average weight of trains. A tabular statement is then given of the results of the experiments made by the British Association for the purpose of comparison with those obtained by the author. The general conclusion which he arrives at is, that the resistance of air in a quiescent state is less than had been previously estimated, and that the ordinary atmospheric resistance in railway progression arises from the air being generally itself in motion, and, as the direction of the current is not always oblique, from its producing increased friction in the carriages. This kind of resistance will not increase as the square of the velocity; and as it is the principal one, it follows that the resistance to railway trains increases in a ratio not much higher than the velocity, and that the practical limit to the speed of railway traveling is a question, not of force, but of safety.

Resistance of Railway Trains---Dynamometers.

At a recent meeting of the Institution of Civil Engineers, a discussion on the resistance of bodies moving through fluids took place, which in the end turned upon railway resistance. We give it as interesting and containing new statements upon this point. The method of recording resistance by the apparatus of M. Morin will be found fully described in this journal in the memoir of M. Morin on friction—July, 1842, p. 5, vol. IX, 2d ser.

"Mr. Scott Russell gave an account of the experiments tried by him on vessels of large tonnage, dragging them through the water by a steam tug, and recording the resistance by a dynamometer, the peculiarities of which he described, and exhibited the diagrams produced by it, both with steam vessels and with locomotive engines. The instrument consisted of two pair of plate springs of a parabolic form, as designed by M. Morin, and so proportioned as to have an equal degree of flexure throughout their length. Four self-inking pens, with different ink, recorded upon long strips of paper wound upon barrels all the effects of resistance, etc., by a series of curves, the area of which were afterwards measured by a simple self-registering instrument, which he also exhibited. For measuring the velocity, he used the Pitot's tube; and of its correctness he spoke in the highest terms. Mr. Rennie's experiments on the subject were also discussed, as were also those of Colonel Beaufoy, of Mr. Palmer, Sir John Macneill and Mr. Walker, and the various results arrived at were compared. The general result appeared to be, that with regard to vessels, no general law would be universal in its practical application, as it must be modified by circumstances due to the forms of the vessels, the lateral friction, and numerous causes, all of which must influence the results.

"The application of the dynamometer to testing the resistance of *railway trains* was then discussed, and the members were generally surprised to find so small an amount of inequality of action at the starting of a train, and how soon the diagram showed comparative steadiness of traction. Still the delicacy of the instrument was such as to indicate distinctly every change of gradient, and even the entering and leaving a cutting or tunnel, showing the greater or less influence of the wind. The usual dynamometers with helical springs, and pistons working in oil, were shown to be for such purposes nearly useless, as they smothered the results. It was stated that the table of the force of wind at certain velocities, as given in Smeaton's Reports, was erroneous by 50 per cent., and that the front and the lateral action of the air upon a train constituted a large portion of the actual resistance. It was necessary to make these corrections, which, when made, showed an extraordinary accordance between the calculated resistance and that absolutely recorded by the instrument. The results given showed that a change must take place in the usual allowance for resistance on railways. These tables were promised to the institution within a short time."

Norwegian Railways.—A letter from Norway, dated March the 26th, is quoted by the London Daily News, as stating that Mr. G. Crowe, consul general for England in Norway, has obtained from the government (subject to the approbation of the Strothing) authority to establish a series of railroads, whose principal lines will have their centres in the capital. This gentleman has informed the minister of the interior that three principal banking houses in London—those of Messrs. Coutts, Masterman, and Hanbury—have subscribed £100,000 sterling each for shares in this undertaking.

Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

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Wire Suspension Bridge over the Monongahela, at Pittsburg.

It is with more than ordinary pleasure that we lay before our readers the drawing and description of this work of our esteemed friend and correspondent, JOHN A. ROEBLING, C. E. The readers of this Journal will remember that for years we have employed every opportunity to urge the superiority of wire suspension bridges. Mr. Roebling furnished us with several articles upon the subject in 1841—and these, together with a translation of a memoir of Le Blanc, made expressly for the Journal, and published in vol vii, new series, p. 33, 1841, give about as much information on wire suspension bridges, as can be found in any American work.

The construction of the Fairmount bridge, at Philadelphia, by Mr. Ellet, [for a description and illustration of which, see Railroad Journal, vol. iv, new series, 1840, page 129,] and of the aqueduct at Pittsburg, by Mr. Roebliag, has at last encouraged us to hope that wire bridges are soon to replace the costly, ugly and unsafe structures so common throughout the country. The aqueduct is hardly finished, before we hear of a new work of Mr. Roebling, and next that it is finished and in use. This work, the Monongahela bridge, is a credit to Pittsburg, and to the ingenious constructor—the test which it will afford of this system of construction will be conclusive, as the traffic is a very heavy one, as will be seen from the description.

We consider the aqueduct, however, as the greater work, as it offered greater difficulties, and required greater skill. Had this mode of construction been adopted for the Croton aqueduct at the Harlem river, as we repeatedly advised, an immense amount of money might have been saved to the city of New York—and the work completed long since.

The test to which this beautiful structure has been subjected will, we think, convince those who have heretofore doubted, that the suspension bridge may be adopted, not only with entire safety, but also with great economy, on railroads; and more especially where the *span* and *height* are necessarily great—as will be the case in passing the Connecticut river, at Middletown, for the New York and Boston *contemplated* DIRECT railroad; and over the *Ohio* at *Pittsburg*, at *Wheeling*, and at *Cincinnati*; and over the NIAGARA, just below the FALLS, to connect the Rochester and Niagara Falls railroad with the Gt. Western railroad, from Niagara Falls and Hamilton [C. W.] to Detroit—in relation to all which, Mr. ROEBLING has, we understand, been consulted.—These, if constructed upon the plan of Mr Roebling, will be works of great beauty and strength—especially the one at Pittsburg—which is designed to be a *tri-partite* structure, or to span in *three* directions from a centre pier, and thus connect the point of land between the two rivers with the opposite bank of each; and that at Niagara—which will be 750 feet long, and *over* 200 feet high—will be second only, as a curiosity, to the *cataract* itself. We hope, therefore, that it may be speedily commenced and early in successful use.

The rapid extension of railroads in this country will require a vast number of bridges, and it may be well for those who have them to construct, to investigate the *relative* merits of the different kinds of bridge now in use, before they decide upon the plan to be adopted.

Those who desire information in relation to the *suspension* plan, can obtain it, of the most reliable character, by addressing the gentleman who constructed this beautiful work, at Pittsburg, where he now resides.

In giving this beautiful illustration of the Monongahela bridge, we must not omit to give proper credit to the artist who executed it on stone in such beautiful style. It shows to what excellence the lithographic art has attained in this country, and we most cordially recommend him to all those who desire services of a similar character, either for railroad or other works: and we shall at all times be gratified to aid our railroad friends, when they desire his services.

For the American Railroad Journal.

The new suspension bridge over the Mongahela river at Pittsburgh, was commenced in June, 1845, and opened for travel in February, 1846. The piers and abutments of the old wooden structure, which was destroyed by the great fire, required extensive repairs to be fitted for the reception of the new superstructure. The whole length of the work between the abutments is exactly 1500 feet, and is divided in eight spans of 188 feet average distance from centre to centre. The piers are 50 feet long at bottom 36 feet high, and 11 feet wide on top, battering 1 inch to the foot.

Two bodies of substantial cut stone masonry, measuring 9 feet square and 3 feet high, are erected on each pier, at a distance of 18 feet apart. On these the bed plates are laid down for the support of the *cast iron towers*, to which the *wire cables* are suspended by means of *pendulums*.—Each span being supported by two separate cables, there are, therefore, 18 cables supended to 18 towers.

The towers are composed of four colums, moulded in the form of a two-sided, or cornered, pilaster; they are connected by four lattice pannels, secured by screw bolts. The pannels up and down stream close the whole side of a tower, but those in the direction of the bridge form an open doorway, which serves for the continuation of side-walks from one span to the other.

On top of the pilasters or columns, a massive casting rests, which supports the *pendulum* to which the cables are attached. The upper pin of the pendulum lies in a seat which is formed by the sides and ribs of a square box occupying the centre of the casting. For the purpose of throwing the whole pressure upon the four columns underneath, 12 segments of arches butt against the centre box and rest with the other end upon the four corners.

The pendulums are composed of four solid bar of 2 feet 6 inches long, from centre to centre of pin, 4 inches by one inch—the pins are 3 inches in diameter. To the lower pin, the cable of one span is attached directly, and the connection formed with the next cable by means of four links of 3 feet 6 inches long and 4 inches by 1¼ inch.

The opposite cables, as well as the pendulums, are inclined towards each other—the distance between being 27 feet at the top of the towers, and 22 feet at the centre of a span. The pendulums on the abutments, however, occupy a vertical position.

The two sidewalks are outside of the cables, and 5 feet wide. The roadway between is contracted to 20 feet, and separated from the sidewalks by fender rails, which are raised from the floor by means of blocks of 6 inches high, 8 feet apart. The total width of the bridge between the railings, is 32 feet.

The anchor chains which hold the cables of the first and last span, are secured below ground in the same method which was applied to the aqueduct—their oxidation is guarded against in the same manner.

The cables are 4¼ inches in diameter, and protected by a solid wrapping; they are assisted by stays, made of 1¼ inch round charcoal iron; the suspenders are of the same material, 1¼ inch diameter, and placed 4 feet apart.

The peculiar construction of the Monongahela bridge was planned with the view of obtaining a high degree of stiffness, which is a great desideratum in all suspension bridges: this object has been fully attained. The wind has no effect on this structure, and the vibrations produced by two heavy coal teams, weighing 7 tons each and closely following each other, are no greater than is generally observed on wooden arch and truss bridges of the same span. This bridge is principally used for heavy hauling; a large portion of the coal consumed in the city of Pittsburgh passes over it in four and six horse teams.

As a heavy load passes over a span, the adjoining pendulums, when closely observed, can be noticed to move correspondingly—the extent of this motion not exceeding one half inch. By this accommodation of the pendulums, all *jarring* of the cast iron towers is effectually avoided. Another object of the pendulums is to direct the *resultant* of any forces to which he work may be subjected, through the centre of the towers, as well as of the masonry below.

Two of the piers of the old structure had once given way in consequence of the shaking and pressure of the arch timbers, when subjected to heavy loads. Such an accident can never take place on the new structure, as the piers are only subjected to the quiet and vertical pressure of the towers.

I do not recommend the application of pendulums in all cases; but in this, it appeared to me the best plan which could be adopted.

The two towers on each pier are connected by a wooden beam, properly encased and lined by the same mouldings which ornament the top of the castings.

The lightness and graceful appearance of this structure is somewhat impaired by the heavy proportions of these connections, but I had to resort to it from motives of economy.

The whole expense of this structure does not exceed $55,000—a very small sum indeed for such an extensive work.

A great portion of this work had to be done during last winter, and in cold weather; it was accomplished without any accident, with the exception of one of the workmen who was seized by fits and killed by falling off a pier.

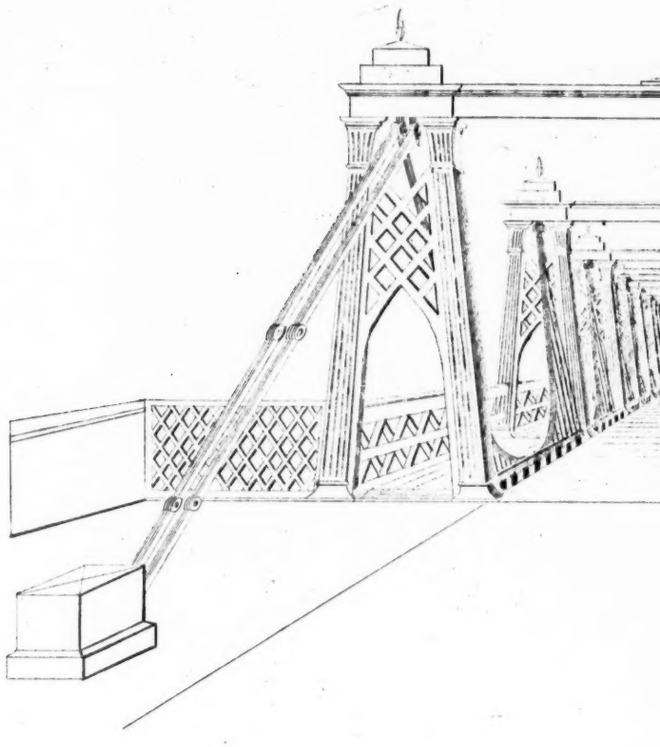
TABLE OF QUANTITIES OF MONONGAHELA BRIDGE.

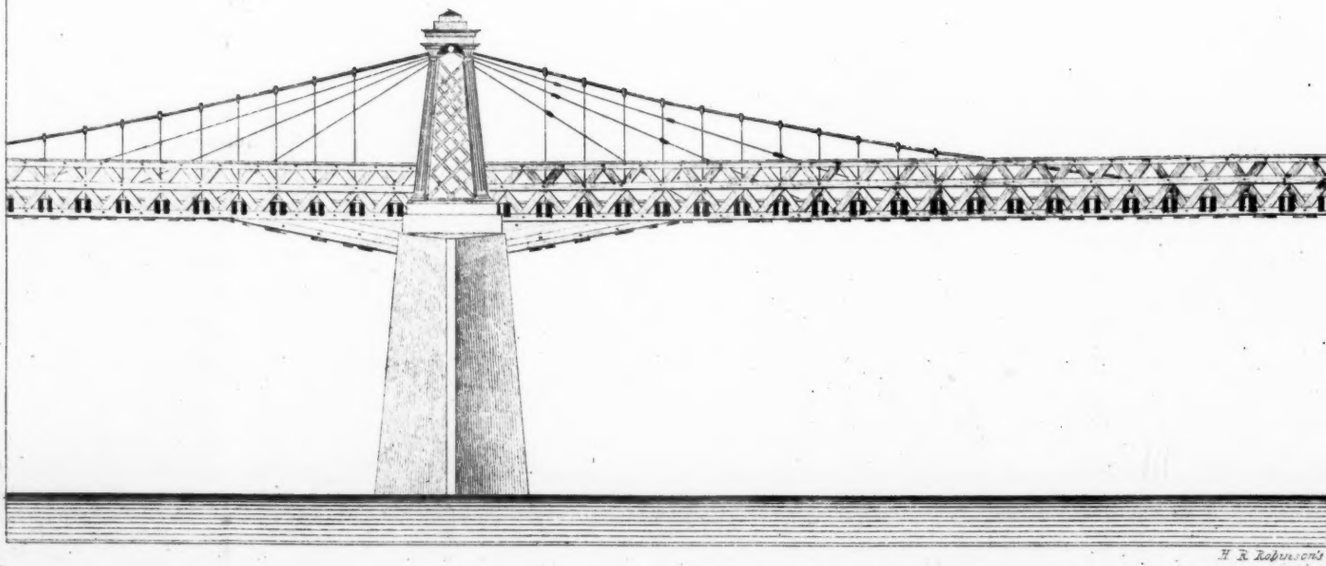
Length of bridge between abutments.....	1500 feet.
Number of spans.....	8
Average width of spans from centre to centre.....	188 feet,

Views of the new Wire Suspension Bridge of eight

Constructed

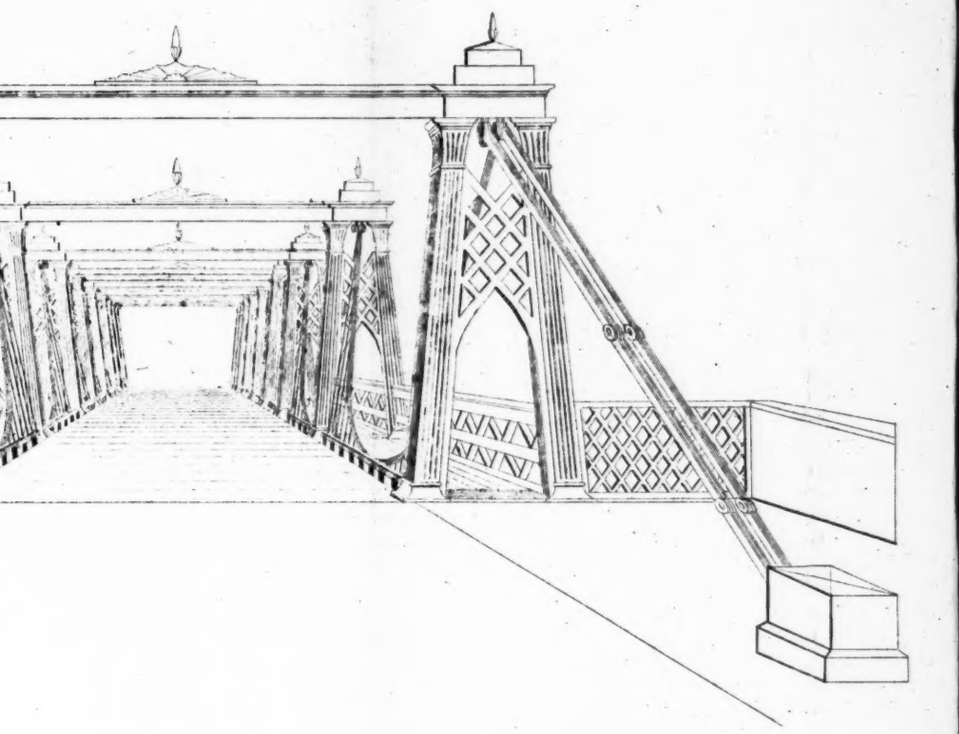
in

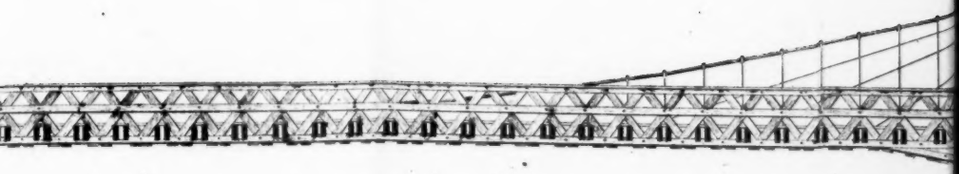




H. R. Robinson's

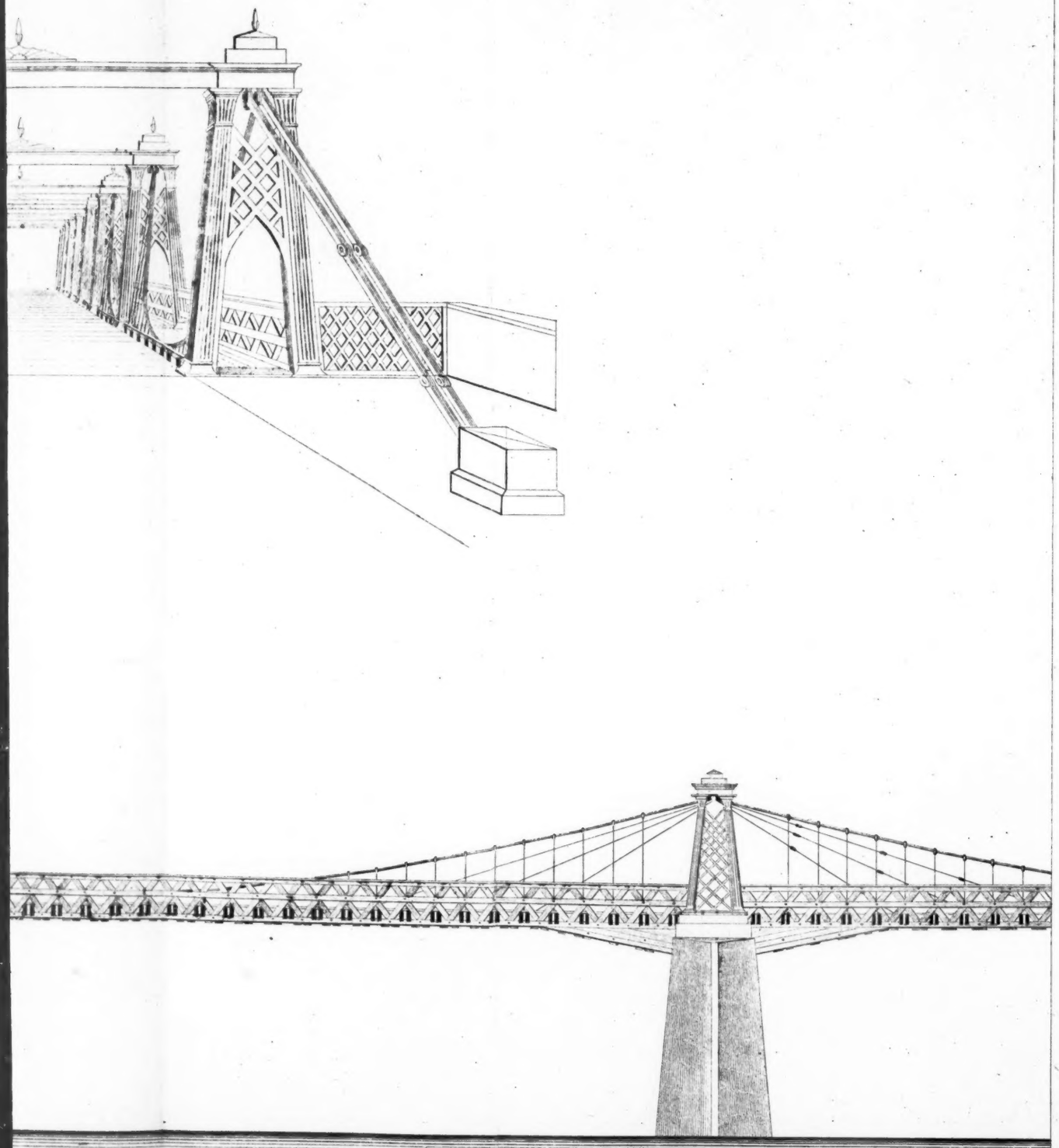
ge of eight Spans over the Monongahela River at Pittsburgh,
Constructed by John A. Roebling C.E.
in 1845 to 1846.





H. R. Robinson's Lith. 142, Nassau St. N.Y.

over the Monongahela River at Pittsburgh,
ohn A. Roebling C.E.
6 to 1846.



Lithographed expressely for the Amr. R.R. Journal.

Diameter of cables	4¼ in.
Number of wires in each	750
Weight of superstructure of one span, as far as supported by the cables	70 tons
Tension of cables resulting from it	122 "
Weight of four six-horse teams, loaded with 104 bushels of coal each	28 "
Tension resulting from it when at rest	49 "
Weight of 100 head of cattle at 800 lbs.	40 "
Tension resulting from it when at rest	70 "
Aggregate weight of one span as far as supported by the cables, plus 100 cattle at rest	110 "
Tension resulting from it	192 "
Ultimate strength of two cables	860 "
Section of anchor chains	36 in.
Section of pendulums	62 "

"All the materials of iron used in the construction of the Monongahela bridge, as well as of the aqueduct, were manufactured at Pittsburg. The wire was furnished by Messrs. R. Townsend & Co. and by Mr. S. M. Wickersham."

Iron Trade.

By the Hibernia we have papers to May 16th.—by them we learn that the prices are well sustained, quotations showing a slight advance since the last arrival.

[*From the Mining Journal May 16th.*]

	£	s.	£	s.	d.
Bar *a* Wales—ton	8	10—	8	5	0
" London	9	0—	9	5	0
Nail rods	0	0—10	0	0	
Hoop (staf.)	11	0—11	5	0	
Sheet	9	0—12	5	0	
Bars	10	10—11	0	0	
Welsh cold blast foundry pig	4	5—	5	0	0
Scotch pig *b* Clyde	0	0—	3	10	0
Rails	19	15—10	0	0	
Russian, CCND *c*	0	0—16	0	0	
" PSI	0	0—16	0	0	
" Gourieff	0	0—14	10	0	
" Archangel	0	0—13	12	6	
Sweedish *d*, on the spot	0	0—11	10	0	
" Steel, fagt	0	0—15	5	0	
" " kegs *e*	0	0—14	5	0	

From our correspondent.

Iron.—The transactions in Welsh and Staffordshire continue to be very limited, and quotations are scarcely supported; large sales of Scotch pig have been made within the last 10 or 12 days, said to be upwards of 20,000 tons; at prices varying from 65s. to 70s., with a few small parcels at 72s. 6d., but the market is flat again, with sellers at 70s. Our quotations for foreign are nominal, there being no sales made lately.

Communicated by Messrs. Whitcomb and Barton.

English iron continues firm, with a fair amount of business doing. A further advance has taken place in Scotch pig iron, and considerable transactions done at from 70s. to 72s. net cash, according to brand and number. We quote the price 72s. 6d. cash, and 75s. bill, at four months date, with a very firm market.

Glasgow Pig Iron.—May 14.—The market for pig iron has continued firm during the week, and closed to-day at 72s. 9d., net cash, for No. 1.—The extent of business has been very limited, and the export orders seem entirely exhausted for the present. There is consequently a reduction of about 10 per cent. on rates of freight of pig iron to foreign ports.

Important if true.—A letter, received this morning from Birmingham, announces the important branch of manufacture of iron as still continuing prosperous—there being many large orders on hand, which cannot be executed for a long time to come. The demand for locomotive engines is so great, that the large makers will not engage to execute fresh orders under three years. The agent of an extensive colliery proprietor, near Dudley, lately tendered a considerable order for engines, for mineral purposes—but it could not be undertaken within that period. The home consumption for iron is very brisk, particularly from the engineering department; there is therefore, now no prospect of a reduction in price.

Railway Speculation in England.

Our papers by the late arrival give, as far as we have been able to judge by a cursory examination, but a small hope for the abatement of the spirit of speculation; in fact there has been something of a revival. The recent measures of government for the relief of shareholders, have actually increased the gambling in stocks—only a new direction has been given to the current.

By the present regulations, a bill must be presented to the shareholder after sufficient notice, and unless a certain majority decide upon going on, the company must "wind up." With scarcely an exception, these meetings have resulted in a vote to go on, and in some cases this vote has been "almost" unanimous.

That it is *impossible* that a large proportion of the schemes now before parliament should go on to construction, we shall prove to our readers in another number. We have before us a valuable lesson, it is to be hoped that we may profit by it.

We are much indebted to "A Canadian" for his excellent notice of a great work, which we trust will prove the best kind of *peace maker*, and produce a more lasting and friendly union of interests than any *annexation*.

Our correspondent is in error, however, in saying that we have taken no notice of this undertaking, as will be seen by a reference to our last volume—pages 508, 587 and 729.

For the American Railroad Journal.

SIR: Among the many schemes which your paper advocates, with so much ability and zeal, I do not observe that the projected road from Rome, in the state of New York, to Kingston, in Canada, occupies any place. It may not be within your knowledge, or that of many of your readers, that the legislature of Canada has, during its present session, amended the charter of the Great Western railroad, by allowing that company to continue its road to Toronto, some thirty-six miles to the east of its former terminus—Hamilton. In connection with this amendment, the act incorporating the Wolfe Island, Kingston and Toronto road was so framed as to extend that line from the boundary line of the province opposite cape Vincent, (the proposed northern terminus of the Rome and Kingston road,) across Wolfe Island to Kingston, and thence across the north shore of lake Ontario to Toronto, a distance of about one hundred and forty-six miles.

At this latter place, the two roads would meet and a line of communication by railroad from Detroit, (the western terminus of the Great Western road,) through Canada to Kingston and cape Vincent be opened. This is the scheme: and now for the means of carrying it into execution, and the likelihood of that being done within a reasonably short period.

It will be within your recollection, that Sir Allan McNab, the president of the Great Western railroad company, visited Great Britain, in connection with the business of that company, in the summer of last year; his mission was to get the balance of the Gt. Western stock taken up in the English market. In this he succeeded, through the agency of Mr. Hudson and others, in a very short time. On Sir Allan's return to Canada, he met first the provisional committee of the Wolfe Island, Kingston and Toronto road; and subsequently a number of the citizens of Kingston, at a public dinner given to him by them, and gave on both occasions the strongest assurances that the English capitalists interested in the Great Western road would come to the assistance and support of the Wolf Island, Kingston and Toronto road the moment a charter was procured for it. Subsequently, when the report of the preliminary survey of the road, with the statistical information accompanying it, was laid before the public and the importance of the work, as an auxiliary to the business of the great Western pressed upon the attention of the gentlemen interested in that road, a letter was sent out from England to Sir Allan Mc Nab, authorizing him to sign the names of the English stockholders in the Great Western road to the petition for a charter for the Wolfe Island, Kingston and Toronto road, and *Mr. Hudson, Mr. Moss, Mr. Masterman and others of the leading railroad men of the day, are now mentioned, and included by name*, along with almost all our leading men in the act incorporating the last mentioned company. I need not dwell upon the ability of such men as I have named to carry a railroad, such as the one under consideration, into operation. They are the same men who sold out some two years ago the Gt. French road, which they had built and worked for several years, for seven millions of francs. They embrace, among themselves, a capital sufficient to build four or five such roads as ours, and their names carry influence enough in the English stock market to procure capital to almost any extent. Now these men are embarked with us in our road, they have evinced their will in the most earnest manner, and we know they have the means. I will mention one more fact in order to show the view taken in England on the subject of these roads—it is a fact which any of your readers can ascertain for themselves, by turning to a file of the London Times, viz: that the stock of the Great Western railroad, a Canadian enterprize, recollect, and one which is only just about to be entered upon, is quoted in that paper, the leading one of the day, and the position of which is a pledge for its accuracy, at 5¼ per cent., premium. A fact of this sort shows more satisfactorily than anything I can say, that the Canadian railroads are in high favor in England, and that stock in them is certain to be taken up. Unfortunately, a dispatch from the colonial secretary, Mr. Gladstone, to the different governors of North American colonies, instructs them not to give the royal assent to any bill incorporating a railroad, except after the persons applying for the charter shall have complied with the regulations in his dispatch, which are wholly inapplicable to Canada, having been framed with English feelings to counteract an inordinate railroad speculation—whereas, in Canada, instead of wanting our courage "slacked" in that manner, we want more "fire." Railroad enterprize wants to be fostered, not counteracted—on this account, the bill incorporating the Wolf Island, Kingston and Toronto road, although it has received the sanction of both houses of parliament, will not become law probably for a couple of months. We are assured, however, in a letter from the member for Kingston, who had charge of the bill, that "the legislature and government of Canada will remonstrate so strongly against the impolicy of the restrictions insisted on by Mr. Gladstone, that there is little doubt that the bill will eventually receive her majesty's assent."

Thus stand our Canadian railroads. I have perhaps dwelt too long upon them; but I have done so with the view to show yourself, Mr. Editor, and the New York people, that no reasonable doubt can be entertained of their being constructed. I now turn to the bearing which they will have upon the business of this country and the United States, a subject which might be beneficially dilated upon at considerable length, but which I shall only touch so far as I conceive it to bear upon the proposition that it is

the interest of the "Empire city" to carry through the Rome and Kingston road without loss of time.

There are many merchants in your city fully alive to the importance and extent of what is termed "the Canadian business;" and who are also aware that it has increased with amazing rapidity in the last seven or eight years. What has hitherto been done, however, is but the commencement of the beginning—population has increased in Canada west during the last ten years faster than it has done in any state in the union—the business heretofore done between the United States and Canada has been wholly an *import* business on the part of the latter. Suppose Sir Robert Peel's free trade bill goes into operation—a similar action will take place here and in the United States.

A series of resolutions calling upon Great Britain to request the United States to remove all duties upon Canadian produce have already been laid before the Canadian house of assembly; they may or may not be adopted during the present session, but that they will follow the fate of Sir Robert Peel's bill eventually admits in my opinion, of no doubt. It then we are to have free trade on both sides of the St. Lawrence, what follows? This necessarily, that the great porportion of Canadian business will be done through the United States. Who will go or send round nearly two thousand miles by the Saint Lawrence, when they can arrive at the desired point, the Atlantic, by going through the United States, with a distance only of some four hundred miles. The position that the great current of business will run by the shortest route to the place of consumption or use, admits of no questioning. And if all obstacles are removed, and the thing left to itself, Canadian business will run to New York and Boston, as sure as the St. Lawrence runs to the Atlantic.

Now, Mr. Editor, the Boston people are "wide awake" on this point, so are the Montreal people, so are the Portland people, but so are *not* the New York people. The Montreal and Portland road has occupied a good deal of public attention, and has been noticed on several occasions in your Journal. What is the object and design of that road? Why, to attract the business of Canada to Portland and Boston. Who have been its warmest supporters? The Bostonians. The Plattsburg and Ogdensburg road stands precisely in the same position; it has been brought prominently before the public, the stock has been taken, the work is actually commenced—and who have been mainly instrumental? The Bostonians. The Canada business forms a large item in their estimate of its importance. It is said they have purchased one hundred thousand dollars worth of real estate in Ogdensburg, under the impression that place would become a great depot for Canadian trade. The Boston people make every exertion to attract this trade there; and the New Yorkers none. And yet the natural advantages are altogether in favor of New York. *Western* Canada is *Canada* for all commercial purposes—the exports of the province come together from that section. It was stated by the inspector general, the head of the fiscal department of the present administration in the Canadian house of assembly last month, and not denied by any one, that with the exception of peas and rye, the produce imported into Canada east through the Lachine canal *from Canada west exceeded the exports of the province.* Now, what does this show? Why, that Canada east, so far from being an exporting country is obliged to stop a portion for its own consumption from the abundance of the western province, on its passage through its territory. If this be so the business of Canada west is what the people of New York should aim at. The construction of the Rome and Kingston road would necessarily give them this—by that route they can place Canada west *nearer them by two hundred miles* than it will be by either of the other railroads to Boston; they would have only *one hundred* miles of road to construct, while the others will have some *four hundred*—they will pass through a rich and fertile country, *amply competent, out of its own business, to sustain the road*, which will not be the case with either of the others. Every natural facility, too, is offered by their route, while obstacles of serious importance to any other but Boston people, present themselves on the others. In one of them, the Ogdensburg route, the crossing of lake Champlain will in the winter form a very cogent argument against the road; in the other, the Portland route, the road will pass through a country producing nothing, and when completed, will still leave a distance of ninety miles between its terminus and Boston, and both will leave the place whose business they wish to get, *two hundred miles further away* than it would be from New York, if the Rome and Kingston road were built.

The subject is amply capable of extension, but I feel that I have already trespassed too much upon your room. I could not have expressed myself more tersely, and said all I wished to say, or I would have done so. If my remarks do but attract your attention and interest, I feel that the Rome and Kingston road will have a far more able and experienced advocate than I have it in my power to be, and I shall be highly gratified with the result of my present communication. I am, Mr. Editor, your most obedient servant, A CANADIAN.

Kingston, Canada, May 25th, 1846.

An Act Relating to Railroads.

The act of the Massachusetts legislature regulating the crossing of highway by railroad, contains some provisions worthy of notice.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Sec. 1. Every railroad corporation which may hereafter construct a railroad across any turnpike, highway, or townway, shall construct it so as to cross over or under the turnpike, highway, or townway. And if the railroad shall be constructed to cross over the turnpike, highway, or townway, a sufficient space shall be left under the railroad conveniently to accommodate the travel upon the turnpike, highway, or townway—and such railroad corporation shall build, keep up, and maintain in good repair, such bridges, with suitable and convenient approaches thereto, as may be required to accommodate the travel upon the turnpike, highway, or townway, over such crossing, except such as are provided for in the second section.

Sec. 2. The county commissioners of the county in which such crossing is situated, upon the application of the railroad corporation, or of the proprietors of the turnpike, or of the selectmen of the town, or of the mayor and aldermen of the city in which the crossing is situated, after due notice to the railroad corporation, the proprietors of the turnpike, and such selectmen, or mayor and aldermen, not being themselves the applicants, and to any other person or parties, as they may direct—and, after hearing the parties, may authorize and require the railroad corporation to construct their railroad at such crossing, upon a level with the turnpike, highway, or townway, in such manner as they may direct; and if they shall consider it necessary, may require the railroad corporation to erect and maintain a gate across the railroad at such crossing, and to provide an agent to open and close the same, as is provided in the eightieth section of the thirty-ninth chapter of the revised statutes. And the railroad corporation shall pay the cost of every such application, excepting in cases where the county commissioners shall deny the application of the proprietors of a turnpike, or the selectmen of any town, or the mayor and aldermen of any city.

Sec. 3. Every railroad corporation shall erect and maintain suitable fences, with convenient bars, gates, or openings therein, at such places as may reasonably be required, upon both sides of the entire length of any railroad which they may hereafter construct, except at the crossings of any turnpike, highway, or other way, or in any places where the convenient use of the railroad would be obstructed thereby. And shall also construct and maintain sufficient barriers, at such places as may be necessary, where it is practicable to do so, to prevent the entrance of cattle upon the railroad.

Sec. 4. Any railroad corporation which shall unreasonably neglect to comply with any of the provisions of this act, shall, for each and every such neglect, forfeit a sum not exceeding two hundred dollars, for every month during which such neglect shall have continued.

April 16. Approved by the governor.

Southern Railroad Company.

Extract from the Report of the Committee appointed by the Citizens of Vicksburg to obtain a Charter from the Legislatures of Alabama and Mississippi; together with the Documents accompanying the same.

The committee appointed by a meeting of the citizens of Vicksburg, on the 6th December, 1845, to solicit charters from the legislatures of Alabama and Mississippi for the Charleston and Western railroad, report:

That those states have, by concurrent acts, chartered the Southern railroad company for the objects in view, and a copy of these acts is hereto appended.

The capital is $3,000,000, divided into shares of $100 each; on which $5 must be paid at the time of subscription, $5 at six months, $5 at 8 months, and $5 at 10 months afterwards, and the residue as the same may be called for by the company, not exceeding $10 a share in 60 days. The company is to be organized as soon as $500,000 shall be subscribed, for which purpose books of subscription will be opened in May next.

The company has all the necessary powers to construct, use, and receive the income of the road perpetually, between West Point, on the eastern line of Alabama, and Jackson, Mississippi, with provisions to connect with, or in certain contingencies to own, on the same terms, the links between West Point and Montgomery, and between Brandan and Jackson, and with powers to acquire any connected road by purchase and with the assent of the proper authorities.

The part of the two per cent. fund of Alabama set apart for this route, was by law of last year loaned to the Montgomery and West Point railroad company, to aid in completing that link.

The two per cent. fund of Mississippi, amounting to near $300,000, and most of it now subject to draft on the U. S. treasury, is granted to the Southern railroad company on certain terms securing its application, as a *gift* to encourage subscriptions of stock.—These terms are:

1st. That the company be organized. 2d. That an amount of stock equal to the fund subscribed in Mississippi, and either paid or well secured. And, 3d. That the fund be paid over to the company no faster than equal sums shall have been expended by the company in its road, or else that guaranties sat-

isfactory to the governor shall have been given that it will be faithfully applied in making the road to which the act of congress appropriates the fund.

The management rests with nine managers elected by the stockholders, one appointed by the state of Alabama and one by the governor of Mississippi. The latter is in addition required to report to the governor as to the application of the two per cent. fund, from which he receives $500 per annum for these services, until the road shall be completed.

The tolls are to be fixed annually by the company, published, and "not changed oftener than once a year," with a restriction that the annual net profits shall not exceed "25 per cent."

The company, its capital and property, are exempt from taxation until a portion of the road be completed and brought into actual use, and then "such portion may be taxed the same per centage and no more upon the capital expended in the construction thereof, as lands in the state shall be taxed."

The Alabama subscriptions are to be applied first to making the road in Alabama, and the Mississippi subscriptions first towards making the road in Mississippi. Other subscriptions may be applied to such part of the work as the company may prefer. Provision is made for the immediate progress and completion of the road between Jackson and Brandon, and for its becoming part of the Southern railroad company's line, upon their repaying the expenditure to be made for its completion; in which event the state releases and transfers to that company its entire interest in that road.

The above is a summary of the acts. In the selection of the route, there is no designation of points between Brandon and Montgomery, and all the advantage is secured which a choice of routes on a line of 210 miles length gives, in the way of favorable surface and cheap rights of way.

We proceed to consider this railroad in reference to—

1st. Its connection with other railroads.

This road will extend from Jackson, Mississippi, to Montgomery, Alabama, a direct distance of 103 miles in Mississippi, and 124 miles in Alabama, or total air line 227 miles, or about 240 miles on any probable location of the railroad.

From Jackson it connects with the Mississippi river at Vicksburg by means of the railroad now in use.

Eventually, it will probably have a branch to Natchez, and extensions westward from the Mississippi river towards Texas.

At Montgomery it connects with the Montgomery and West Point railroad, of which about 45 miles are completed and the remainder of 45 miles principally graded and the work in active progress. It is the expectation of the managers to have it completed to West Point next year.

From this point to the Macon and Western railroad is a distance of 53 miles. The right to construct that connection, as well as one to Columbus and thence to intersect the Montgomery and West Point road, have been granted; and there is no doubt that in one or both these modes Montgomery will be connected with the Macon and Western rail road. This road binds together the Charleston and Savannah lines, and is within a few months of entire completion 101 miles, from Macon to Atlanta. For all practical purposes, therefore, we may consider the Southern railroad as the only wanting link in the chain to bind the Mississippi river to the Atlantic ocean, both at Charleston and Savannah.

The distance from Savannah to Visksburg may be set down at 670 miles.

2d. The uses of this road.

When completed and connected with the Atlantic and Mississippi termini, it reduces the time of travel from end to end to about two days. It reduces travel between Charleston and St. Louis to six days—New Orleans three days—Galveston five days. It brings down the time of travel between Vicksburg and Washington city to a little over four days, and New York five days. And, on the completion of the Chattanooga and Nashville railroad, this will be the ordinary route of travel to Nashville, which will be reached from Vicksburg in 48 hours.

In regard to freight; it will reduce the time of conveyance from New York to Vicksburg to about ten days, of which six days are allowed to the sea trips to Charleston and four for railroad conveyance to Vicksburg. It will reduce insurance from at least 7 per cent. from New York or Boston to Vicksburg down to 1 per cent. or less to Charleston and none thence to Vicksburg. If the goods be worth 50 cents a pound this would be more than half the railroad charge—leaving profit to the road.

It would enable a merchant, whose packages are usually valuable, (much beyond 50 cents per lb., on the average) to save in direct expenditure, to have have his orders promptly supplied, to maintain a large business upon comparatively light stocks, and to exclude from the western markets all merchants who shall persist in continuing the risks, delays, and loss of capital by the cape of Florida route.

It will open a direct avenue for western supplies for the interior of Alabama, Georgia and the Carolinas.

It gives us interior communication between the most important highways in the world, which is not subject to the casualties of storms, wrecks, pirates, or war.

It makes the south Atlantic states, indentified, as they are, with us in all respects, to be neighbors to the great west; and by this means gives assurance of an equitable management of the government of the United States, by which our interests will be protected and our prosperity promoted. It gives to public force that rapidity of motion, which is the great element of its efficiency either to "suppress insurrection or repel invasion."

These things and more does it accomplish in its general uses. To the country in which it runs it brings navigable waters without their overflows, and commerce without hazard or interruption. To that country *all* times of the year are thus rendered times of commerce and travel; supplies from other places are cheapened and its own productions can reach the market at small cost and at times to suit the owner.

3d. The *probable cost.*

On such subjects certainty and exactness cannot be attained. We can but use the experience we have to lead us to rational estimates of the future. Such is our daily habit in all matters of business.

But we are not treading a new path.—Twenty years ago, a short road at Quincy, to carry marble, was all the pioneer we had. Now we have nearly 4,000 miles of Rail Road in actual daily operation in the United States; and a great deal more in the rest of the world. The materials of experience are therefore sufficiently abundant. The cost of 79 railroads in the U. States is given in the table published in the American rail road Journal. The aggregate length of them is 3,723 miles, and the cost is $109,841,460; or $29,325,85 per mile.

In the Carolinas and Georgia 785¼ miles cost but $14,063,175, or $17,919 per mile; those of North Carolina and Georgia 583¼ miles long, cost $8,391,723; or $14,387 72 per mile; those of Georgia, 337¾ miles, cost $5,231,723, or $15,489 per mile; the Central railroad in Georgia, 190¼ miles, cost $2,551,723; or $13,570 72 per mile; and that part of the Georgia railroad of 65 miles, which has been constructed of late years, is said to have cost less than $12,000 per mile, including an edge rail; or, as commonly called, a Trail.

The residue of the railroads on the list, in the northern and eastern states, amounting to 2,937¾ miles in length, cost $95,788,295: or $32,633 23 per mile.

The reason of this difference of cost in favor of the southern states, is mainly in the abundance and cheapness of timber, the absence of rock excavations, and the low cost of right of way. In all these points, as well as in the suitableness of surface for a railway, the route from Jackson to Montgomery for the same length is *unequalled.* To Brandon the road is almost entirely graded. Beyond Brandon to the Alabama line it has been surveyed, and (although from want of time, but little care could be bestowed on the selection of the line, and it can therefore be improved) the whole estimate of the engineer for grading, including culverts, and bridges, is but $343,439 or 97½ miles; for $3,522 44 per mile. Appended is a copy of that report in which the whole cost of the 97½ miles is estimated at $1,083,428; or $11,112 per mile which estimate includes $668,507 or $5,856 48 per mile for *iron* only; leaving for all other items of expenditure $414,921; or $4,225 60 per mile. This report, although we might not rely entirely upon its estimates, at least establishes beyond a doubt that the part of the route surveyed will admit of the *cheap* construction of a railroad.

Two of this committee, when in Alabama made diligent inquiry as to the surface of the probable route of this road from the state

line to Montgomery, and not only inspected the profiles and maps of surveys of several railroads in this region heretofore surveyed but also procured useful details as to the route generally. These means of information enable us to affirm with great confidence, that the route in Alabama is more favorable than it is upon the surveyed line in Mississippi, and presents no unusual difficulty, with the exception of the crossing of the Tombigbee and Alabama rivers; the cost of which, they suppose, cannot exceed, but will probably be much short to $60,000, in addition to the usual outlay. The committee therefore, do not hesitate to express the belief that this road can be made at as small cost per mile as any railroad of its length which has heretofore been examined and presented to the public.

At $8,000 per mile with heavy flat bar, or $13,000 with the Huron, 45 to 50 lbs. to the yard, the whole cost of 240 miles between Jackson and Montgomery would be $1,920,000 on one plan, and $2,880,000 on the other, to which must be added for bridges, and the necessary locomotives, cars, etc., and from it must be deducted for the parts already graded on the line.

4th. The *income.*

On this point the railroads in use furnish much experience, of a part of which a table is appended. It contains all the full statements of length of road and gross income, which are exhibited in the American Railroad Journal—being 28 railroads in the northern and eastern states, including Pennsylvania, and 9 in the southern states. The 28 in the north and east in the year 1844 produced a gross income on 1,320 miles, of $6,190,649; or $4,693 per mile; while the southern railroads, of 922¾ miles long, yielded $2 313,623, or $2,507 31 per mile, those of the cotton states of South Carolina and Georgia have yielded $1,109,392 or 539¾ miles; or $2,055 per mile.

These results were upon 37 companies, with 2241¼ miles of railroads of an average length of only a fraction over 60 miles each, while the Boston and Albany railroad of 200 miles length, connecting with western trade, received as much as $5,910 a mile within the year; thus manifesting from experience, (what is so very obvious on abstract reasoning) that the receipts per mile of railroad are immensely increased with the increased line of railroad placed in connection. As this line will be 650 to 890 miles long, the most favorable experience of the shortest lines now in use could be fairly applied to an estimate of income for this work.

But waving these considerations, and adopting for an estimate of the business of the two states of Alabama and Mississippi, the *less* favorable results indicated by the Georgia and South Carolina railroads, (which are also subject to the disadvantage, that the Savannah competes with the Charleston line for the traffic of the same country, and thus divides the business) and we make the following results:

Item 1st. 240 miles of road, at a calculation for the local income of $2,055 per mile gross annual receipts, (the same as those of the South Carolina and Georgia roads, and $1,081 less than the Vicksburg and Jackson railroad, as per tables annexed).	$493,200
Item 2d. Through travel added, (see note). 40 pass each way daily at 4 per cent. prem.	280,320
Item 3d. Through freights added, (see note).	180,000
" 4th. Increased mail pay (do.)	36,000
Gross annual receipts	$999,520

From the gross annual receipts must be deducted for expenses. The tables annexed show upon the northern 28 roads an expense of 47·62 per cent., on the gross income, and upon the 9 southern roads 53·13 per cent on the gross income. At the rates furnished by southern roads on $989,528 of gross income the 53·13 per cent for expenses is $525,913—leaving a net annual income of $463,607, which on $3,000,000 of cost would be $15 45 per annum on each share of $100.

If the experience of the Vicksburg and Jackson railroad were assumed as the basis of calculation, for the first item, the gross annual income would be—

	$1,248,960
and deducting the 53·13 per cent. for expenses	663,573
there would be a net annual income of...	$585,387

which on 3,000,000 cost would be 19·50 on each share of stock.

These estimates pretend to no higher certainty than belongs to reasonable conjectures derived from experience in like items of detail. The first, founded on the less favorable experience, is believed to be lower than the working results of this road will prove with ordinary good management.

Little Miami Railroad.—We have always predicted the most brilliant success for this road, and we are happy to see that it is approaching rapidly to completion, with results, as to business and profits, which already show that it will realize the most sanguine expectations of its friends. The road is now in operation to Xenia, only 62 miles, and the receipts for the last four months, for freight and passengers, including the transportation of the mail, have been as follows:

Receipts in December	$8,008 28
" " January	8,624 02
" " February	7,991 49
" " March	8,884 71
	$33,508 50

These receipts, it will be perceived, are at the rate of one hundred thousand dollars per year—and the expectation is that they will be doubled when the road shall be finished to Springfield, which will be in the course of this year. The road will have cost then, with the machinery and furniture on it, about a million of dollars, or less than twelve thousand dollars per mile.

When it reaches Springfield, it will have penetrated to the centre of one of the richest counties in this state, the great wheat, corn, and pork region, and will also intersect the national road, one of the great lines of the summer land travel. Some of the largest and finest flour mills in Ohio, are situated around Springfield; and the number of these as well as of the quantity of wheat raised, will be greatly increased by the making of this road. There is no risk, therefore, in saying that the business of the railroad will be doubled after it reaches Springfield.

This road passes within fifteen miles of Dayton. Will not that connection be made? Unquestionably it must. One-half the stock will be taken by the persons interested in the Little Miami railroad, if the Dayton people will make the remainder—the charter having been already obtained. This will bring a great deal of business.

And how long will it be before branches will be made through Clinton, Highland and Ross counties to Chilicothe? Not long.—Those are very productive counties, and they will not be satisfield until the way to Cincinnati is open to them. The people have only to will it. That branch will unite with the Little Miami railroad, at Todd's Fork, forty miles from Cincinnati.

The railroad from Xenia to Columbus is under contract, and we understand progressing rapidly. The distance is a little over 40 miles, of which 32 miles run on a direct line, without a curve and without grading.

The Mad river railroad, from Springfield to Sandusky, is proceeding rapidly to completion. The distance is 134 miles. Part of this road, at the northern end, is travelled—including which, the grade is done to Urbana, 120 miles, and the remaining 14 miles is more than half done. It will be ready for the iron to Bellefontaine, 105 miles from Sandusky, by the 16th of July next; and, if the autumn be favorable, we hope to have the whole line from Cincinnati to Sandusky open for travel next winter. This road is very straight, and runs over a level country.—There are but three bridges in the whole line. The cost of the road, with the furniture on it, will not exceed 9,000 dollars per mile.—*Cincinnati Atlas.*

Smoking Cars—

We do not mean cars with a smoky stove or cars smoking with the breaths and vapor from the damp garments of fifty or sixty persons; no—we mean cars expressly provided for the lovers of the "weed." Such should be provided in all trains; people will smoke, and we do not blame them for it—they should have proper accommodations. See how John Bull rebels against the new bye-law, and Brother Jonathan has a still stronger taste that way.

"On the whole, though the public willingly accords with the by-laws of railways, there is some disposition to evade the *prohibition of smoking.* A correspondent of the Times, who signed 'Tobacco-Stopper,' thus writes to that journal: I came to town this morning in a bran new carriage of the Croydon company, rejoicing in every luxury of modern first-class refinement, but reeking of tobacco smoke! In the tobacconists' windows you may see craftily contrived 'railway pipes,' adapted for instantaneous concealment. You know, and I know, and everybody knows, that a resolute smoker will smoke on railways, in spite of all precautions. Well, then, why not revive the often discussed plan of railway divans? Attach a second-class carriage to each train, undivided, and with seats round the sides, instead of across; strew the floor with sawdust, write 'for smokers only' on the outside, and shut the cloud compellers

up fast in it, leaving them to the enjoyment of their unsavory luxuries, and me and others to the cleaner pleasures of a sweet seat. They manage these things in the north."

Generous.—We understand that Capt. Henry Robinson, of this village, has presented to the N. York and Erie railroad company, that portion of his property over which their road is to pass. The value of the property deeded to the company by Capt. R. is said to be $6,000. By the way, the company are preparing to "go ahead," with their branch road in good earnest.—*Newburgh Gazette.*

The Del. and Hud. canal co. has declared a semi-annual dividend of 8 per cent., payable on 8th inst.

SPRING STEEL FOR LOCOMOTIVES, Tenders and Cars. The Subscriber is engagep in manufacturing Spring Steel from 1¼ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used, its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address

JOAN F. WINSLOW, *Agent,*
Albany Iron and Nail Works,

THE WESTERN AND ATLANTIC Railroad.—This Road is now in operation to Oothcaloga, a distance of 80 miles, and connects daily (Sundays excepted) with the Georgia Railroad.

From Kingston, on this road, there is a tri-weekly line of stages, which leave on the arrival of the cars on Tuesday, Thursday and Saturday, for Warrenton, Huntsville, Decatur and Tuscumbia, Alabama, and Memphis, Tennessee.

On the same days, the stages leave Oothcaloga for Chattanooga, Jasper, Murfreesborough, Knoxville and Nashville, Tennessee.

This is the most expeditious route from the east to any of these places.

CHAS. F. M. GARNETT,
Chief Engineer.

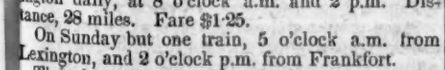
Atlanta, Georgia, April 16th, 1846. 17

TWO LOCOMOTIVE AND MARINE EN- gine Boiler Builders. Pascal Iron Works, Philadelphia. Welded Wrought Iron Flues, suitable for Locomotives, Marine and other Steam Engine Boilers, from 2 to 5 inches in diameter. Also, Pipes for Gas, Steam and other purposes; extra strong Tube for Hydraulic Presses; Hollow Pistons for Pumps of Steam Engines, etc. Manufactured and for sale by

MORRIS TASKER & MORRIS,
Warehouse S. E. corner 3d and Walnut Sts., Philadelphia 1t

SCRIBNER'S ENGINEERS' AND ME- chanics' Companion. For sale at this office. Price $1·50.

LEXINGTON AND OHIO RAILROAD. Trains leave Lexington for Frankfort daily, at 5 o'clock a.m., and 2 p.m.



Trains leave Frankfort for Lexington daily, at 8 o'clock a.m. and 2 p.m. Distance, 28 miles. Fare $1·25.

On Sunday but one train, 5 o'clock a.m. from Lexington, and 2 o'clock p.m. from Frankfort.

The winter arrangement (after 15th September to 15th March) is 6 o'clock a.m. from Lexington, and ma. 9. from Frankfort, other hours as above.

35ly

RAILROAD IRON—1700 TONS VERY Best English Rails, ready to be delivered.—These Rails weigh 60 lbs., the lineal Yard, are 3½ inches deep; 4 inches deep at base; 2½ inches wide at top; 17½ feet long, except one-tenth of 15 and 12½ feet in length.

A first rate Steam Pile Driver built by "*Dunham & Co.*," has never been in use, is in perfect order, and for sale a bargain; also 12 Railway Passenger Cars that have never been used, which will be sold very low. DAVIS, BROOKS & CO.,
June 1. 30 Wall Street.

STEPHENS' RULING AND MECHANICAL Drawing Ink, for Engineers, Artists and Designers. This article will be found superior to the best Indian Ink for the above purposes. It does not smear with India rubber or wash off with water. It flows freely from the drawing pen, and never corrodes or encrusts it. It may be used on a plate or slab, with a camel's hair brush, diluting it with water, or thickening it by drying, as required. It has the advantage of being ready for immediate use.

Sold in conical-shaped bottles, convenient for using from, without any stand, at 15 cents each.

ALSO,

STEPHEN'S WRITING FLUIDS.

These compositions, which have so remarkably extended the use of the STEEL PEN, are brought to great perfection, being more easy to write with, more durable, and in every respect preferable to the ordinary ink. In warm climates they have become essential.

They consist of a Blue Fluid, changing into an intense Black color.

A Patent Unchangeable Blue Fluid, remaining a deep Blue color.

A Superior Blue Ink of he common character, but more fluid,

A brilliant Carmine Red, for Contrast Writing.

A Carbonaceous Record Ink, which writes instantly black, and being proof against Chemical Agents, is most valuable in the prevention of frauds.

Also, a new kind of MARKING INK for Linen and Inkstands adapted for preserving Ink from evaporation and dust.

Sold in Bottles of various sizes, by all Stationers and Booksellers.

Be sure to ask for Stephens' Writing Fluid.

N. B.—These unchangeable Blue Fluids are Patent Articles; the public are therefore cautioned against imitations, which are infringements, to sell or use which is illegal.

Stephens' Select Steel Pens.

The utmost possible care having been bestowed uuon the manufacture of these articles, so as to propere the highest finish, they can be confidently recommended, both for flexibility and durability.

All the above articles are prepared by *Henry Stephens*, the inventor, No. 54 Stamford-street, Blackfriars road, London, and sold by Booksellers and Stationers in bottles of various sizes, and may be had wholesale from the agents in Boston, New York, Philadelphia, Baltimore, Washington, Charleston, New Orleans, and St. Louis.

Wm. W. Rose, Wall-street, New York, ismy general agent in the United States.

VALUABLE PROPERTY ON THE MILL Dam For Sale. A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 fe. with lathes, work benches,

Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry. at end of main brick building, 60x45½ feet two stories high, with a shed part 45½x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side o Parker st., containing 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

Blacksmith shop, 49 feet long by 20 feet wide.

For terms, apply to HENRY ANDREWS, 48 State st., or to CURTIS, LEAVENS & CO., 106 State st., Boston, or to A. & G. RALSTON & Co., Philadelphia. ja45

RICH & CO'S IMPROVED PATENT SALAMANDER SAFES.

Warranted free from dampness, as well as fire and thief proof.

Particular attention is invited to the following certificates, which speak for themselves:

TEST No. 10.

Certificate from Mr. Silas C. Field, of Vicksburgh, Mississippi.

On the morning of the 14th ult., the store owned and occupied by me in this city, was, with its contents, entirely consumed by fire. My stock of goods consisted of oil, rosin, lard, pork, sugar, molasses, liquors, and other articles of a combustible nature, in the midst of which was one of Rich's Improved Patent Salamander Safes, which I purchased last October of Mr. Isaac Bridge, New Orleans, and which contained my books and papers. This safe was red hot, and did not cool sufficiently to be opened until 16 hours after it was taken from the ruins. At the expiration of that time it was unlocked, when its contents proved to be entirely uninjured, and not even discolored. I deem this test sufficient to show that the high reputation enjoyed by Rich's Safes is well merited. S. C. FIELD.

Vicksburgh, Miss., March 9th, 1846.

Certificate from Judge Battaile, of Benton, Mississippi.

In October last I purchased one of Rich's Improved Salamander Safes, which was in the fire at the burning of my law office, and several adjoining buildings in this place, on the 17th of November last, at about half-past one o'clock A. M. of that day. The building was entirely consumed; and I take pleasure in stating that my papers in said safe were preserved without injury. A receipt book which was in said safe, had the glue drawn out of its leather back by the heat, and the back broken; but the leaves of the book, and the writing thereon, were entirely uninjured; and some of the writing which was of blue ink, was also left wholly uneflaced and not in the least faded. Said safe was by the fire heated perfectly red hot, and I do not hesitate to say, that said safe is a perfect security against fire. But the safe tumbled over during the fire, and being heated red hot, the outer sheeting of the door became pressed in, and the bolts of the lock bent, so that it could not be unlocked, and I had to have it broken open. JOHN BATTAILE.

Benton, Miss., December 27,1845.

Still other Tests in the Great Fire of July 19, 1845.

The undersigned purchased of A. S. Martin, No. 138½ Water street, one of Rich's Improved Patent Salamander Safes, which was in our store, No. 54 Exchange place. The store was entirely consumed in the great conflagration on the morning of the 19th inst. The safe was taken from the ruins 52 hours after, and on opening it, the books and papers were found entirely uninjured by fire, and only slightly wet—the leather on some of the books was parched by the extreme heat. (Signed,)

RICHARDS & CRONKHITE.

New York, 21st July, 1845.

One of Rich's Improved Salamander Safes, which I purchased on the 2d of June last of A. S. Marvin, 138½ Water street, agent for the manufacturer, was exposed to the most intense heat during the late dreadful conflagration. The store which I occupied, No. 46 Broad street, was entirely consumed; the safe fell from the 2d story, about 15 feet, into the cellar, and remained there 14 hours, and when found, I am told, and from its appearance afterwards, should judge that it had been heated to a red heat. On opening it, the books and papers were found not to have been touched by fire. I deem this ordeal sufficient to confirm fully the reputation that Rich's safe has already obtained for preserving its contents against all hazards. (Signed,)

WM. BLOODGOOD.

New York, 21st July, 1845.

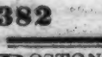
The above safes are finished in the neatest manner, and can be made to order at short notice, of any size and pattern, and fitted to contain plate, jewelry, etc. Prices from $50 to $500 each. For sale by

A. S. MARVIN, General Agent,
138½ Water st., N. Y.

Also by Isaac Bridge, 76 Magazine street, New Orleans.

Also by Lewis M. Hatch, 120 Meeting street, Charleston, S. C. 16 tf

BOSTON AND ALBANY.—WESTERN RAILROAD.—Fare Reduced.



1846..Spring Arrangement..1846

Commencing April 1st.

Passenger trains leave daily, Sundays excepted—

Boston	7½ p. m.	and 4 p. m.	for Albany.
Albany	6½ "	and 2½ "	for Boston.
Springfield	7 "	and 1 "	for Albany.
Springfield	7 "	and 1½ "	for Boston.

Boston, Albany and Troy:

Leave Boston at 7½ a. m., arrive at Springfield at 12 m., dine, leave at 1 p. m., and reach Albany at 6½ p. m.

Leave Boston at 4 p. m., arrive at Springfield at 8 p. m., lodge, leave next morning at 7, and arrive at Albany at 12½ m.

Leave Albany at 6½ a. m., arrive at Springfield at ½ m., dine, leave at 1½ p. m., and arrive at Boston 6½ p. m.

Leave Albany at 2½ p. m., arrive at Springfield at 8½ p. m., lodge, leave next morning at 7, and arrive at Boston at 12 m.

The trains of the Troy and Greenbush railroad connect with all the above trains at Greenbush.

Fare from Boston to Albany, $5; fare from Springfield to Boston or Albany, $2 75.

Boston and New York, via Springfield: Passengers leaving Boston at 4 p. m., arrive in Springfield at 8 p. m., proceed directly to Hartford and New Haven, and thence by steamers to New York, arriving at 5 o'clock a. m.

For Buffalo: the trains for Buffalo leave Albany at 7½ a. m. and 7 p. m., arriving at Buffalo at 8 a. m. and 8 p. m. next day. Returning, arrive at Albany at 4 a. m. and 4 p. m.

New York and Boston, via Albany: the trains from Boston arrive at Albany in season for the 7 o'clock boats to New York. Returning, the boats, leaving New York at 5 and 7 p. m., reach Albany at 5 a. m., in ample season for the morning trains to Boston.—Steamboats also leave Albany at 7 a. m. and 5 p. m. and stop at the usual landing landing plrces upon the river.

The trains of the Springfield, Hartford and New Haven railroad, connect at Springfield, and passengers from Albany or Boston proceed directly on to Hartford and New Haven.

Montreal: through tickets to Montreal may be obtained in Boston, by which passengers may proceed to Troy, and thence by stage via Chester, Elizabeth, etc., and in the season of navigation by canal to Whitehall, and thence by the splendid steamers of Lake Champlain to St. John, via Burlington, and thence by railroad and steamers to Montreal.

The trains of the Hudson and Berkshire railroad connect at Chatham and State Line.

The Housatonic railroad connects at State Line.

The trains of the Connecticut River railroad connect at Springfield, and passengers may proceed without delay to Northampton, and thence by stage to Greenfield, Brattleboro, Bellows Falls, Hanover, Haverhill, etc.

Stages leave West Brookfield for Ware, Endfield, New Baintree and Hardwick; also leave Palmer, for Three Rivers, Belchertown, Amherst, Ware and Monson; Pittsfield for North and South Adams, Williamstown, Lebanon Springs, etc.

Merchandize trains run daily (Sundays excepted) between Boston, Albany, Troy, Hudson, Northampton, Hartford, etc.

For further information apply to C. A. Read, agent, 27 State street, Boston, or to S. Witt, agent, Albany.

JAMES BARNES,
Superintent and Engineer.

Western Railroad Office,
Springfield, April 1, 1846. } 14 1y

MANUFACTURE OF PATENT WIRE Rope and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers etc., by JOHN A. ROEBLING, *Civil Engineer*, Pittsburgh, Pa.

These Ropes are in successful operation on the planes of the Portage Railroad in Pennsylvania, on the Public Slips, on Ferries and in Mines. The first rope put upon Plane No. 3, Portage Railrord, has now run 4 seasons, and is still in good condition. 2v19 1y

BACK VOLUMES OF THE RAILROAD JOURNAL for sale at the office, No. 23 Chambers street.

ENGLISH PATENT WIRE ROPES—FOR THE USE OF MINES, RAILWAYS, ETC.—for sale or imported to order by the subscriber.

These Ropes are manufactured on an entirely different principle from any other, and are now almost exclusively used in the collieries and on the railways in Great Britain, where they are considered to be greatly superior to hempen ones, or iron chains, as regards safety, durability and economy. The plan upon which they are made effectually secures them from corrosion in the interior, as well as the exterior of the rope, and gives a greater compactness and elasticity than is found in any other manufacture.

Many of these ropes have been in constant operation in the different mines in England, and on the Blackwall and other inclined planes, for three and four years, and are still in good condition.

They have been applied to almost every purpose for which hempen ropes have been used—mines, heavy cranes, standing rigging, window cords, lightning conductors, signal halyards, tiller ropes, etc. Reference is made to the annexed statement for the relative strength and size. Testimonials from the most eminent engineers in England can be shown as to their efficiency, and any additional information required respecting the different descriptions and application will be given by

ALFRED L. KEMP,
75 Broad street, New York, sole agent in the United States.

Statement of Trial made at the Woolwich Royal Dock Yard, of the Patent Wire Ropes, as compared with Hempen Ropes and Iron Chains of the same strength.—October, 1841.

WIRE ROPES.				HEMPEN ROPES.			CHAINS.		STRENGTH.
Wire gauge number.	Circumference of rope.	Weight per fathom.		Circumference of rope.	Weight per fathom.		Weight per fathom.	Diameter of iron.	Tons.
	INCH.	LBS.	OZ.	INCH.	LBS.	OZ.	LBS.	INCH.	
11	4¼	13	5	10	24	–	50	15-16	20
13	3½	8	3	8½	16	–	27	11-16	13½
14	3¼	6	11	7½	12	8	17	9-16	10½
15	2¾	5	2	6½	9	4	13½	1-2	7½
16	2⅝	4	3	6	8	8	10½	7-16	7

N.B. The working load, with a perpendicular lift, may be taken at 6 cwt. for every lb. weight per fathom, so that a rope weighing 5 lbs. per fathom would safely lift 3360 lbs., and so on in proportion.

RAILROAD IRON.—The subscriber having taken contrats for all the Railroad Iron he can manufacture at his Iron Works at Trenton, until July next, will gladly receive orders for any quantity to be delivered after that time, not exceeding thirty tons per day. Also has on hand and will make to order Bar Iron, Braziers' Rods, Wire Rods and Iron Wires of all sizes, warranted of the best quality. Also manufactures and has on hand Refined American Isinglass, warranted equal in strength to the Russian. Also on hand a constant supply of Glue, Neats' Oil, &c. &c.

PETER COOPER, 17 Burling Slip.
New York, January 23d, 1846. 1y 10

C. J. F. BINNEY,
GENERAL COMMISSION MERCHANT and Agent for Coal, and also Iron Manufactures, etc.

No. 1 CITY WHARF, Boston.
Advances made on Consignments.
Refer to Amos Binney, *Boston.*
Grant & Stone, } *Philadelphia.*
Brown, Earl & Erringer, }
Weld & Seaver, *Baltimore.*
December 8, 1845. 1m 50

RAILROAD IRON—500 TONS OF 67 LBS. per yard—5 inches high—of the *double headed* pattern, which is now wholly used in England—now on the passage, and a further quantity will be contracted for. Also

500 tons T pattern, 56 lbs. per yard, for sale by
BOORMAN, JOHNSTON & CO.
4t24 119 Greenwich street.

LAWRENCE'S ROSENDALE HYDRAulic Cement. This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight paper-ea barrels, by JOHN W. LAWRENCE,
142 Front street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y

A. & G. RALSTON & CO., NO. 4 South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad Iron, viz:
180 tons 2½ x ¼ inch Flat Punched Rails, 20 ft. long.
25 " 2½ x ¼ " Flange Iron Rails.
75 " 1 x ¼ " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 1tf

LARD OIL FOR MACHINERY, ETC.—Winter pressed, cleansed from gum, and manufactured expressly for engines and machinery of all kinds, railroads, steamboats, woollen and other manufactures, and for burning in any lamp without clogging the wick. Engineers of railroads and others who have used this oil, and to whom reference can be made, give it preference over the best sperm for its durability, and not requiring to be cleaned of like that, and costing about two-thirds the price. For sale by the barrel, and samples can be sent for trial, by addressing C. J. F. BINNEY,
Agent for the Manufacturer,
11 eop 1m Boston, Mass.

ENGINEERS' AND SURVEYERS'
INSTRUMENTS MADE BY
EDMUND DRAPER,
Surviving partner of
STANCLIFFE & DRAPER.

No 23 Pear street, near Third, below Walnut, Philadelphia.

ATLANTIC AND ST. LAWRENCE RAILroad.—Notice to Contractors.—Proposals will be received at the office of the Atlantic and St. Lawrence railroad company in this city, from the 17th to the 27th day of June next, for the grading, masonry and bridging of a division of the road, extending from a point at or near Portland to Royall's river in North Yarmouth—a distance of about eleven miles.

Plans, profiles and specifications will be exhibited and the requisite information given at the engineer's office in Portland on and after the 17th day of June.

Persons offering to contract for the work, or any part of it, who are unknown to the undersigned or the directors of the company, will be required to accompany their proposals with references as to character and ability.

A further extension of the road, embracing a distance of some fifteen or more additional miles, will be prepared for and put under contract about the first of August next.

By order of the Board of Directors.
WM. P. PREBLE, President.
A. C. MORTON, Chief Engineer.
Portland, Me., May 18, 1846. 1m25

WILLIAM R. CASEY, Civil Engineer, New York. Address Box 1078, Post-office New York. 2

PATENT HAMMERED RAILROAD, SHIP and Boat Spikes. The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. JOHN F. WINSLOW, *Agent.*

Albany Iron and Nail Works, Troy, N. Y.

The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co, Boston. ja45

PATENT RAILROAD, SHIP AND BOAT Spikes. The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

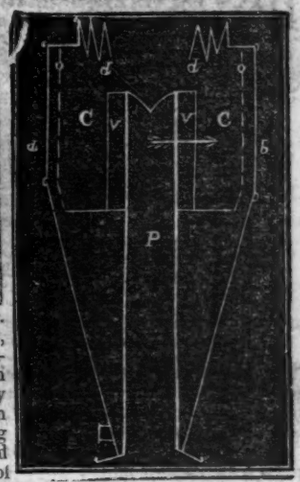
All orders directed to the Agent, Troy, N. York, will be punctually attended to.

HENRY BURDEN, *Agent.*

Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal Iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

*** Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufcturing so as to keep pace with the daily increasing demand. ja45

FRENCH AND BAIRD'S PATENT SPARK ARRESTER.



TO THOSE INTERESTED IN Railroads, Railroad Directors and Managers are respectfully invited to examine an improved SPARK ARRESTER, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

E. A. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendant Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendant Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterns, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich; G. B. Fisk, President Long Island Railroad, Brooklyn.

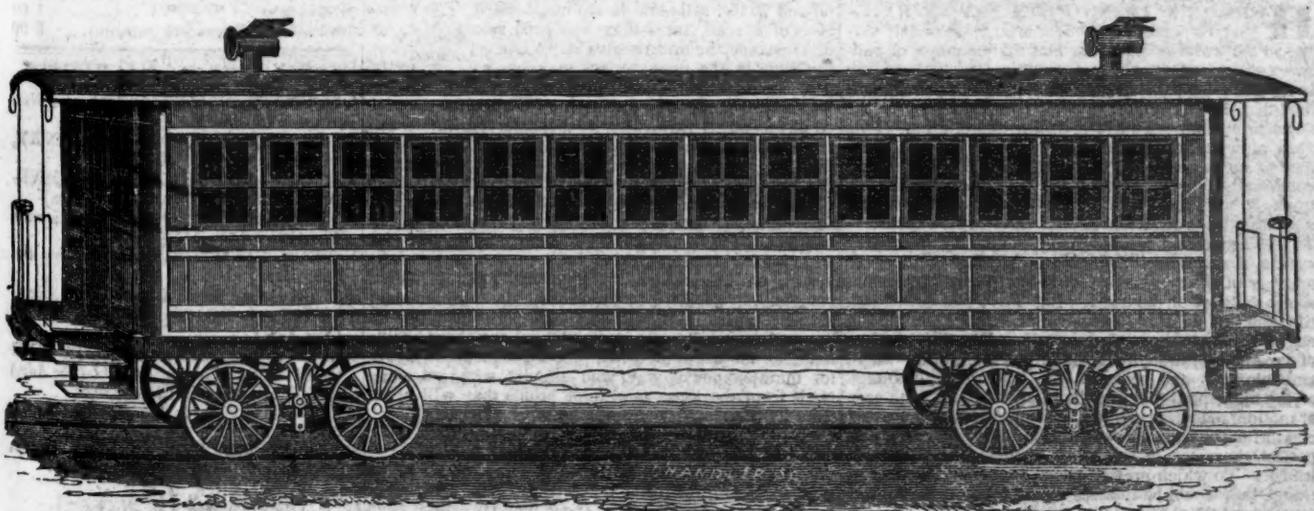
Orders for these Chimneys and Arresters, addressed to the subscribers, care Messrs. Baldwin & Whitney, of this city or to Hinckly & Drury, Boston, will be promptly executed. FRENCH & BAIRD.

N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. *Philadelphia, Pa., April* 6, 1844.

*** The letters in the figures refer to the article given in the *Journal* of June, 1844. ja45

BENTLEY'S PATENT TUBULAR STEAM BOILER. The above named Boiler is similar in principle to the Locomotive boilers in use on our Railroads. This particular method was invented by Charles W. Bentley, of Baltimore, Md., who has obtained a patent for the same from the Patent Office of the United States, under date of September 1st, 1843—and they are now already in successful operation in several of our larger Hotels and Public Institutions, Colleges, Alms Houses, Hospitals and Prisons, for cooking, washing, etc.; for Bath houses, Hatters, Silk, Cotton and Woollen Dyers, Morocco dressers, Soap boilers, Tallow chandlers, Pork butchers, Glue makers, Sugar refiners, Farmers, Distillers, Cotton and Woollen mills, Warming Buildings, and for Propelling Power, etc., etc.; and thus far have given the most entire satisfaction, may be had of D. K. MINOR, 23 Chambers st. New York. a

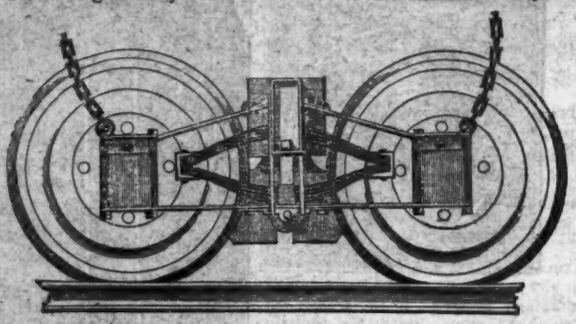
DAVENPORT & BRIDGES' CAR WORKS.



DAVENPORT & BRIDGES CONTINUE TO MANUFACTURE TO ORDER, AT THEIR WORKS, IN CAMBRIDGEPORT, MASS. Passenger and Freight Cars of every description, and of the most improved pattern. They also furnish Snow Ploughs and Chilled Wheels of any pattern and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All orders punctually executed and forwarded to any part of the country

Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minues.

RAY'S EQALIZING RAILWAY TRUCK.—THE SUBSCRIBER having recently formed a business connection in the City of New



York, expressly for the manufacture of the newly patented and highly approved Railroad Truck of Mr. Fowler M. Ray, is ready to receive orders for building the same, from Railroad Companies and Car Builders in the United States, and elsewhere.

The above Truck has now been in use from one to two years on several roads a sufficient length of time to test its durability, and other good qualities, and to satisfy those who have used it, as may be seen by reference to the certificates which follow this notice.

There have been several improvements lately introduced upon the Truck, such as additional springs in the bolster of passenger cars, making them delightful riding cars—adapting it to tenders, trucks forward of the locomotive, and freight cars, which, with its original good qualities, make it in all respects the most desirable truck now offered to the public.

Orders for the above, will, for the present, be executed at the New York Screw Mill, corner 33d street and 3d avenue, (late P. Cooper's rolling mills) and at the Steam Engine Shop of T. F. Secor & Co., foot of 9th street, East river, (of which firm the subscriber was late a partner) under the immediate supervision of Mr. Ray himself.

Several sets of trucks containing the latest improvements have recently been turned out for the New York and Erie railroad, and the New Jersey Transportation company, which may be seen upon said roads.

The patronage of Railroad Companies and Car Builders is respectfully solicited.

New York, May 4, 1846. W. H. CALKINS, and Others.

To all whom it may concern:—This is to certify that the New Haven, Hartford and Springfield railroad co., have had in use six sets of F. M. Ray's patent trucks for the last 20 months, during which time it appears to me, they have proved to be the bes and most economical truck now in use.

[Signed,] WILLIAM ROE, Sup't of Power.

I certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Philadelphia and Reading railroad for some time past, under a passenger car.

For simplicity of construction, economy in cost, lightness of material, and extreme ease of motion, I consider it the best truck we have ever used. Its peculiar make also renders it less liable to be thrown off the track, when passing over any obstruction. We intend using it extensively under the passenger and freight cars of the above road.

Reading, Pa., October 6, 1845. [Signed.] G. A. NICOLL,
Sup,t Transportation, etc., Philadelphia and Reading Railroad.

To all whom it may concern:—This is to certify that the N. Jersey Railroad and Transportation company have used Fowler M. Ray's Truck for the last seven months, during which time it has operated to our entire satisfaction. I have no hesitation in saying that it is the simplest and most economical truck now in use. [Signed,] T. L. SMITH,

Jersey City, November 4, 1845. N. Jersey Railroad and Transp. Co.

This is to certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Long Island railroad for the last year, under a freight car.

For simplicity of construction, economy in cost, lightness of material and ease of motion, I consider it equal to any truck we have in use.

Long Island Railroad Depot, Jamaica November 12, 1845. } [Signed,] JOHN LEACH, Sup't Motive Power.

HERRON'S PATENT AMERICAN RAILWAY TRACK,

As seen stripped of the top ballasting

HERRON'S IMPROVEMENTS IN RAILway Superstructure effect a large aggregate saving in the working expenses, and maintenance of railways, compared with the best tracks in use. This saving is effected—1st, Directly by the amount of the increased load that will be hauled by a locomotive, owing to the superior evenness of surface, of line and of joint. This gain alone may amount to 20 per cent. on the usual load of an engine.—2d, In consequence of the thorough combination, bracing, and large bearing surface of this track, it will be maintained in a better condition than any other track in use, at about one-third the expense.—3d, As action and reaction are equal, a corresponding saving of about two-thirds will be effected in the *wear* and *tear* of the *engines* and *cars*, by the *even surface* and *elastic structure* of the track.—4th, The great security to life, and less liability to accident or damage, should the engine or cars be thrown off the rails.—5th, The absence of jar and vibration, that shake down retaining walls, embankments and bridges.—6th, The great advantage of the high speed that may be safely attained, with ease of motion, reduction of noise, and consequently increased comfort to the traveller.—7th, The really *permanent* and perfect character of the Way, insuring regularity of transit. To which may be added the great increase of travel, that would be induced by the foregoing qualities to augment the revenue of the railroad.

The cost of the Patent track will depend on the quantity and cost of iron and other materials; but it will not exceed, even including the preservation of the timber, the average cost of the tracks on our principal railroads. Generally, the timber structure, fastenings and workmanship, exclusive of the cost of the iron rails, will be from $2,300 to $4,000 per mile. On this structure, rails of from 40 to 50 lbs. per yard, will be equal in effect to 60 and 70 lbs. rails laid in the usual way. The proprietors of a road, furnishing approved materials in the first instance, the undersigned will construct the track on his plan in the most perfect manner, with recent improvements, for one thonsand dollars per mile. And he will farther contract to maintain said track for the period of ten years, furnishing such preserved timber and iron fastenings as may be required, and keeping said track in *perfect adjustment*, under any trade not exceeding 100,000 tons per annum, or its equivalent in passenger transportrtion, for *Two hundred dollars per mile per annum.** To insure the faithful performance of this contract, he will pledge one-fourth of the cost of construction, with the accruing interest thereon, regularly vested, until the completion of the contract. So that a company, by securing payment to the undersigned at the specified period, will have only $750 per mile to pay for the workmanship on the track, without any charge being made for the use of the patent, the subsequent payments, for maintenance of way, and amount withheld, being made from the large margin of profits that will result from its use.

JAMES HERRON.
Civil Engineer and Patentee.
No. 277 *South Tenth St., Philadelphia.*

* A general average of the repairs done on six of the most successful railroads in this country, for a period of from six to eight years' use has been found to exceed $625 per mile per annum, exclusive of renewal of rails. But few roads in this country carry as much as 100,000 tons per annum. When a road exceeds that quantity, the repairs due to the additional tonnage, up to 200,000 tons, will be charged at one mill per ton; over the latter, and not exceeding 300,000 tons, nine-tenths of a mill, etc. Where there are two tracks to maintain, a large reduction upon those rates will be made. 1y1

THE AMERICAN RAILROAD JOURNAL is the only periodical having a general circulation throughout the Union, in which all matters connected with public works can be brought to the notice of all persons in any way interested in these undertakings. Hence it offers peculiar advantages for advertising times of departure, rates of fare and freight, improvements in machinery, materials, as iron, timber, stone, cement, etc. It is also the best medium for advertising contracts, and placing the merits of new undertakings fairly before the public.

RATES OF ADVERTISING.

One page per annum	$125 00
One column "	50 00
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One page per month	20 00
One column "	8 00
One square "	2 50
One page, single insertion	8 00
One columnn " "	3 00
One square " "	1 00
Professional notices per annum	5 00

ENGINEERS and MACHINISTS.

J. F. WINSLOW, Albany Iron and Nail Works, Troy, N. Y. (*See Adv.*)
TROY IRON AND NAIL FACTORY, H. Burden, Agent. (*See Adv.*)
ROGERS, KETCHUM AND GROSVENOR, Patterson, N. J. (*See Adv.*)
S. VAIL, Speedwell Iron Works, near Morristown, N. J. (*See Adv.*)
NORRIS, BROTHERS, Philadelphia Pa. (*See adv.*)
KITE'S Patent Safety Beam. (*See Adv.*)
FRENCH & BAIRD, Philadelphia, Pa. (*See Adv.*)
NEWCASTLE MANUFACTURING COMPANY, Newcastle, Del. (*See Adv.*)
ROSS WINANS, Baltimore, Md.
CYRUS ALGER & Co., South Boston Iron Company.
SETH ADAMS, Engineer, South Boston.
STILLMAN, ALLEN & Co., N. Y.
JAS. P. ALLAIRE, N. Y.
H. R. DUNHAM & Co., N. Y.
WEST POINT FOUNDRY, N. Y.
PHŒNIX FOUNDRY, N. Y.
ANDREW MENEELY, West Troy.
JOHN F. STARR, Philadelphia, Pa.
MERRICK & TOWNE, do.
HINCKLEY & DRURY, Boston.
C. C. ALGER, Stockbridge Iron Works, Stockbridge, Mass.